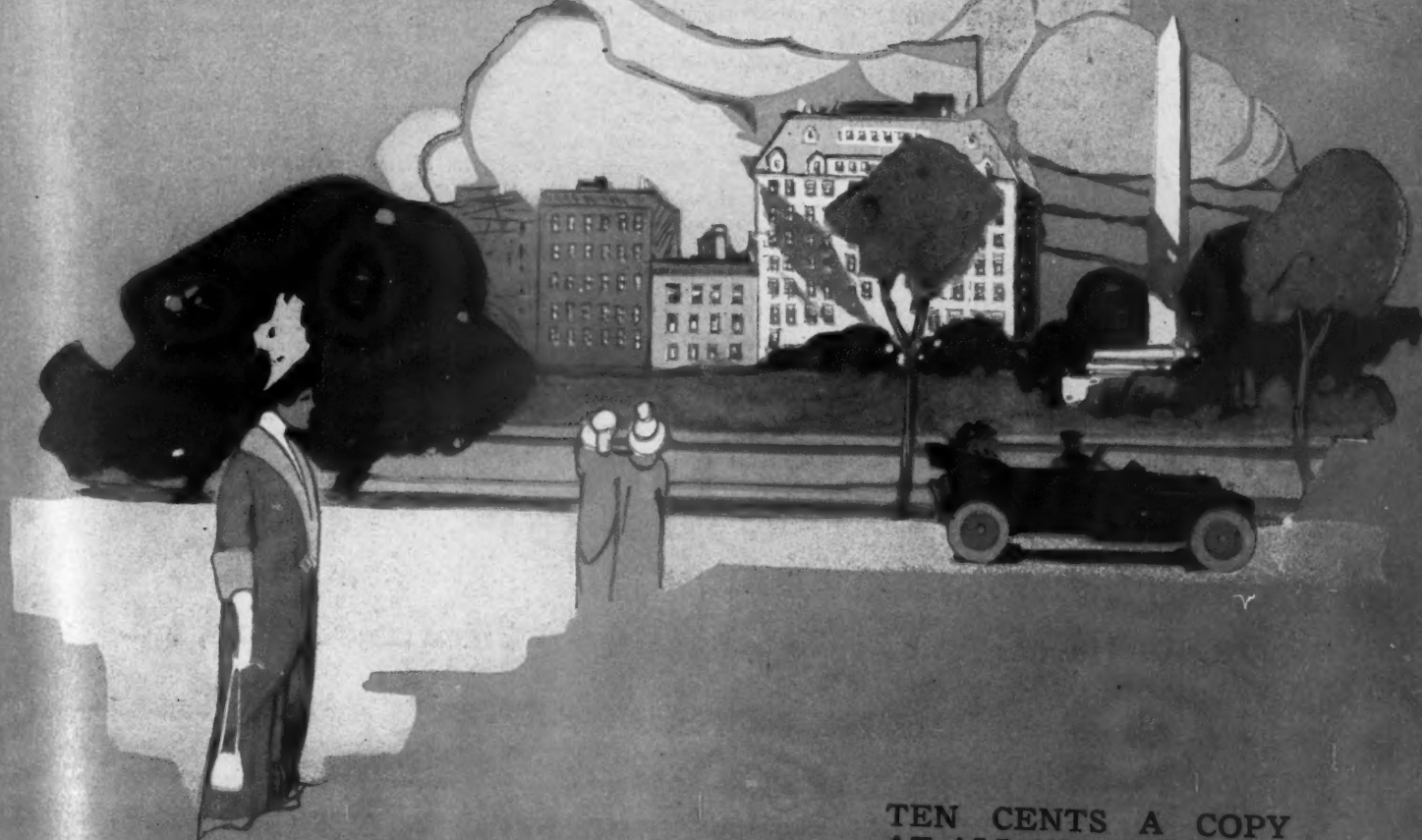


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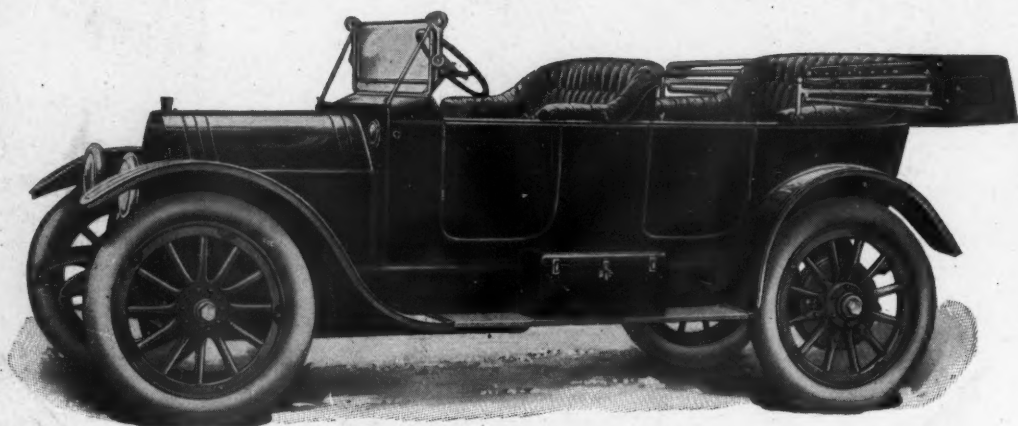
MOTOR AGE

CHICAGO, OCTOBER 10, 1912



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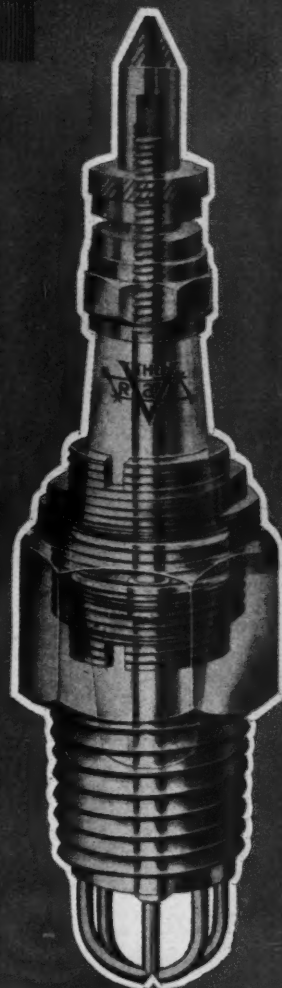
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Grand Prix Honors Captured by Bragg



BRAGG CHASING BERGDOLL

*Fiat Driver Leads
Benz and Stutz in
American Classic at
Milwaukee — Win-
ning Average, 69.3
Miles per Hour*



BRAGG, WINNER OF GRAND PRIX

ON CITY LIMITS TURN

*Masons Win in Both
Pabst and Wisconsin
Challenge Races—
Crowd on Saturday
Numbers 100,000—
De Palma Injured*

MILWAUKEE, WIS., Oct. 6—Running off the Vanderbilt last Wednesday, which returned Ralph de Palma in the Mercedes as winner, the Milwaukee Automobile Dealers' Association brought it's meet to a successful completion yesterday afternoon when the grand prix was run and won by Caleb Bragg in a Fiat at an average of 69.3 miles per hour. The two small-car races on Thursday were lacking in interest. Mortimer Roberts in a Mason winning the Pabst and Harry Endicott in a Mason taking the Wisconsin cup.

They had to coax Bragg to drive in the grand prix. On Wednesday he had

By C. G. Sinsabaugh

announced his withdrawal from the classic out of respect to his friend, the late David Bruce-Brown, who was killed in practice Tuesday, but yesterday morning he could not resist the fascination of the big race and the entreaties of his team mates and so he was one of the twelve who lined up

for the fourth running of the Automobile Club of America's gold cup race at approximately 410 miles.

Cold type fails when it comes to describing the grand prix finish. The tables show that Bragg had 15 minutes 24 seconds over the second car, the Benz driven by Bergdoll; but they do not show how close Ralph de Palma, winner this year of the two big races at Elgin and the Vanderbilt cup, came to snatching away from Bragg the international honors that now are his. Neither do they tell of how this same de Palma flirted with death and how lucky he was that his fate



BRAGG, BERGDOLL AND ANDERSON, ONE, TWO, THREE IN GRAND PRIX



CARS LINED UP FOR GRAND PRIX—BURMAN'S BENZ AND LOZIER IN FOREGROUND

was not similar to that which robbed the motor world of Bruce-Brown. As a result of the daring attempt which he made to add to his laurel wreath, de Palma now is in the Trinity hospital in this city, suffering from abdominal injuries which will confine him to his bed for a week or more. On the final lap de Palma ran into Bragg from the rear, his Mercedes turned over, throwing out both driver and mechanic, and poor de Palma saw even his chances of getting second go glimmering much as they went at Indianapolis in the 500-mile race.

With de Palma eliminated in this sensational manner, Bergdoll in the Benz ran into second place after a hot finish with Anderson in the Stutz, whom he beat by 31 seconds for the position, while Barney

Oldfield, in a Fiat, was fourth, 4 minutes 32 seconds back of Anderson. Clark in a Mercedes and Burman driving Horan's Benz were still running when the race was called off, because of the crew refusing to be held in check any longer. Twelve cars in all started in the race, but half of them were eliminated for one reason or another.

But it was the Bragg-de Palma finish that stirred the crowd of 150,000 to a frenzy and the accident at the eleventh hour undoubtedly robbed the motoring public of the greatest finish that ever had been put up in a grand prix race. Bragg always had been a factor in the race, never being worse than third and having led the field from the thirty-first lap when Tetzlaff went to the side lines for keeps.



FINISH OF BERGDOLL IN BENZ

De Palma had been plugging grimly, fifth and sixth at the start, then going up to third, then second and finally leading in the twenty-second, twenty-third and twenty-fourth laps; then dropping to third for four laps when Tetzlaff and Bragg were battling ahead of them and finally

OFFICIAL RESULTS IN FOURTH ANNUAL GRAND PRIX AT MILWAUKEE AS RECORDED BY THE WARNER ELECTRIC

No.	Car	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		7 miles	15 miles	23 miles	31 miles	39 miles	47 miles	55 miles	63 miles	71 miles	79 miles	87 miles	95 miles	103 miles	111 miles	119 miles	127 miles	135 miles	143 miles	151 miles	159 miles	167 miles	175 miles	183 miles	191 miles	199 miles
41	Flat	Elapsed time	6:34	12:50	19:04	25:14	31:31	37:56	44:27	50:53	57:00	63:39	70:01	76:32	83:06	89:47	96:24	102:56	109:42	116:15	122:44	129:24	136:09	142:22	148:57	155:57
		Lap time	6:34	6:16	7:04	6:10	6:17	6:25	6:31	6:26	7:07	6:39	6:22	6:31	6:34	6:41	6:37	6:32	6:46	6:33	6:29	6:30	11:15	6:43	6:35	6:41
40	Benz	Elapsed time	6:38	13:08	19:33	25:53	32:16	38:40	45:03	51:18	57:46	64:06	70:42	77:20	83:58	90:39	97:42	104:54	111:56	118:53	125:54	132:59	139:37	146:21	153:01	159:41
		Lap time	6:38	6:30	6:25	6:20	7:23	6:24	11:58	8:40	7:48	6:36	7:38	6:38	7:41	9:03	7:35	6:38	6:39	6:42	6:43	6:38	6:44	6:40	6:40	7:15
43	Stutz	Elapsed time	7:14	14:11	21:10	28:05	35:03	42:09	49:01	55:59	62:54	69:35	76:52	83:49	90:44	97:45	104:54	111:56	118:53	125:54	133:04	140:08	147:13	154:27	161:50	169:04
		Lap time	7:14	6:57	6:59	6:55	6:58	7:06	6:52	6:58	6:55	6:41	7:17	6:57	6:55	7:01	7:09	7:02	6:57	8:01	6:10	7:04	7:05	12:37	7:23	7:14
44	Fiat	Elapsed time	8:14	15:02	21:49	28:46	36:04	43:06	50:08	57:00	63:39	70:01	76:32	83:06	89:47	96:24	102:56	109:42	116:15	122:44	129:24	136:09	142:22	148:57	155:57	162:57
		Lap time	8:14	6:48	6:47	6:57	7:18	7:02	7:02	6:42	6:41	6:42	6:40	6:39	6:44	6:45	6:52	6:46	6:59	6:37	6:53	7:03	7:02	6:58	13:07	7:14
39	Mercedes	Elapsed time	7:30	14:53	22:08	29:28	36:48	44:09	51:32	58:47	66:03	73:15	80:27	87:43	95:01	102:20	109:42	117:18	124:41	132:06	139:31	146:55	154:21	161:54	169:32	177:11
		Lap time	7:30	7:23	7:05	7:20	7:20	7:21	7:23	7:15	7:16	7:12	7:12	7:16	7:18	7:19	7:22	7:36	7:33	8:08	7:25	7:24	7:26	7:33	7:38	7:39
42	Benz	Elapsed time	7:09	14:04	21:01	27:48	35:40	42:40	50:00	57:35	64:27	71:38	78:31	85:27	92:20	99:48	107:49	115:49	123:45	131:41	139:37	147:22	155:07	162:57	170:49	178:41
		Lap time	7:09	6:55	6:57	6:47	7:52	7:00	7:20	7:75	7:52	7:06	6:58	6:56	6:33	6:39	10:49	7:56	11:11	10:41	9:28	7:13	7:18	7:24	7:34	7:41
35	Mercedes	Elapsed time	6:42	13:20	19:57	26:33	33:05	39:40	46:13	52:50	59:32	66:07	72:50	79:30	86:12	92:46	99:18	105:48	112:15	118:52	125:20	131:49	138:22	144:55	151:22	157:55
		Lap time	6:42	6:38	6:37	6:36	6:32	6:35	6:33	6:47	6:42	6:35	6:43	6:40	6:42	6:34	6:32	6:30	6:31	6:32	6:26	6:29	6:24	6:32	6:27	6:33
32	Lozier	Elapsed time	6:20	12:37	18:50	25:02	31:17	37:36	43:59	50:38	56:55	63:09	69:17	75:29	81:35	87:55	94:06	100:12	106:11	112:11	118:10	124:10	130:11	136:11	142:11	148:11
		Lap time	6:20	6:17	6:13	6:12	6:15	6:19	6:23	6:09	6:17	6:14	7:59	6:25	6:15	6:07	6:11	6:11	9:03	6:34	6:16	6:31	7:07	6:22	6:28	6:34
34	Mercer	Elapsed time	7:25	14:32	21:36	28:35	35:35	42:37	49:33	56:28	63:49	70:43	77:42	84:39	91:35	98:37	105:34	112:35	119:36	126:34	133:34	140:32	147:32	154:32	161:32	168:32
		Lap time	7:25	7:07	7:04	6:59	7:00	7:02	6:56	6:55	7:21	6:54	6:59	6:57	6:56	7:02	6:57	7:01	7:01	6:48	7:00	12:58	6:22	6:28	6:34	6:40
36	Mercedes	Elapsed time	6:40	13:02	19:28																					
		Lap time	6:40	6:20	6:26	Out—broken shaft																				
31	Benz	Elapsed time	6:58	13:50																						
		Lap time	6:58	6:42	Out—broken piston																					

Drivers: 41, Bragg; 40, Bergdoll; 43, Anderson; 44, Oldfield; 39, Clark; 42, Horan-Burman; 35, de Palma; 33, Tetzlaff; 32, Fontaine; 36, Wishart; 31, Burman



BRAGG GETS FLAG THAT DECLARES HIM WINNER OF THE FOURTH GRAND PRIX

Palma and 7:26 by Bragg and the gap was reduced to 2 minutes 36 seconds when Starter Wagner waved his green flag for both of them. De Palma was chasing his rival with deadly intensity and upon receiving a signal from his pit to "beat it" he stepped on the throttle and had the accelerator flat with the boards when he swung into the North Fond du Lac road. He crept up on the Fiat with great leaps and bounds and at station 11 he had caught his rival. But it was necessary for him to do more than catch him—he had to pass and beat him to the tape by the margin that Bragg had over him at the start.

Bragg 41.

Then came the thriller that spoiled the finish. De Palma was trying to pass and

some say that just as he crept up to the rear wheel of the Fiat Bragg swung over a trifle and the gray Mercedes ran into the rear of the red car.

The Bragg-de Palma battle was the real feature of the race, although Tetzlaff's efforts earlier in the contest stirred the crowd to enthusiasm. Outside of these two incidents, the running of the Stutz, which finished third, was commendable.

A crowd estimated at 100,000 saw the race, but at that the promoters lost money—probably \$25,000. It is admitted a mistake was made in not dividing with the farmers as was done at Elgin, which resulted in the property owners letting in thousands who did not pay any admission fee. At that Milwaukee wants to run both the classics next year.

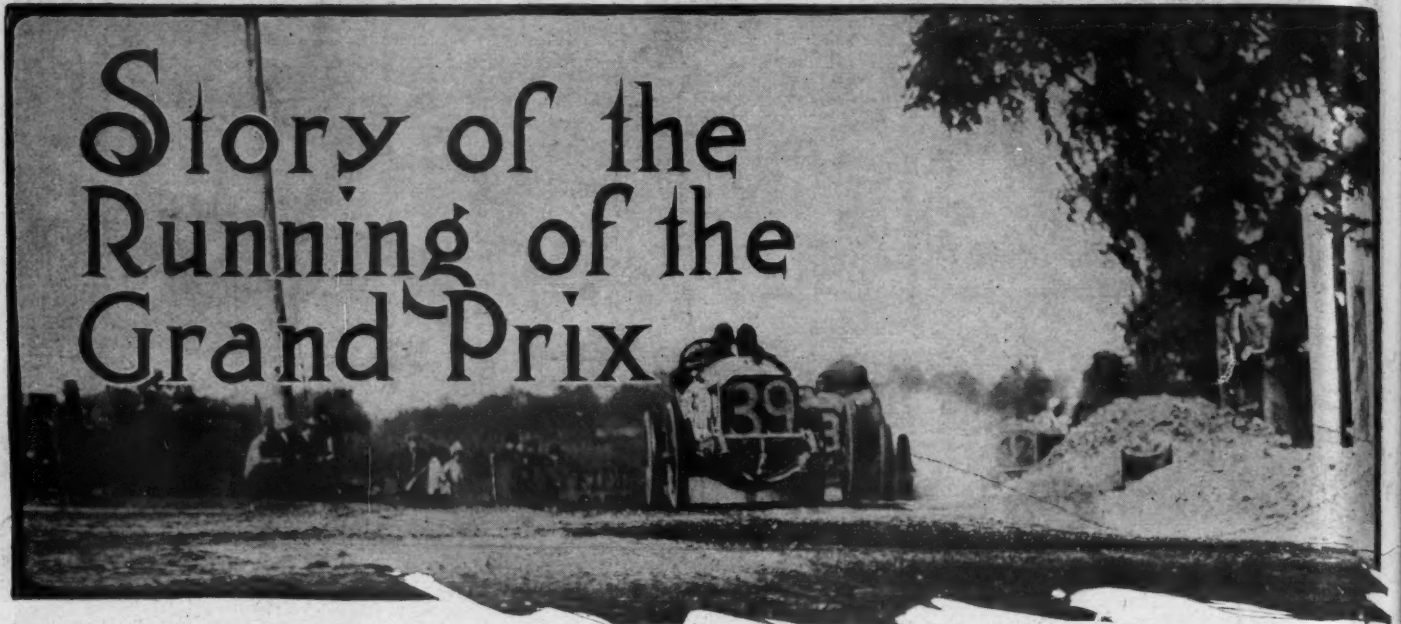
FINISH OF ANDERSON IN STUTZ

becoming runner-up to Bragg when Tetzlaff went out.

With four laps to go, de Palma was 4 minutes 19 seconds to the bad. He made a lap in 6:28 to Bragg's 7:21 and cut the margin to 3 minutes 26 seconds. The fiftieth lap was made in 6:36 by de

TIMER, SHOWING HOW CALEB BRAGG, IN A FIAT WON THE AMERICAN CLASSIC AT A SPEED OF 69.3 MILES PER HOUR

	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52		
High feet	187	187	194	200	207	213	220	227	233	240	246	251	258	265	272	279	286	293	300	307	315	322	329	336	343	350	1	69.3
250 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27	2	65.5
212 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27	3	65.4
3704 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27	4	61.8
3087 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
236 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
2460 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
1838 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
252 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
1216 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
260 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
594 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
267 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
5282 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
275 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
4630 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
283 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
4008 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
291 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
3386 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
299 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
2764 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
307 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
2142 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
315 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
1520 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
323 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
898 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
331 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
276 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
338 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
4934 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
346 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
4312 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
354 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
3690 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
362 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
3068 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
370 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
2446 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
378 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
1824 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
286 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
336 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
1302 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
394 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
580 feet	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:54	7:01	7:03	7:06	7:31	7:11	7:23	7:17	7:23	7:21	7:23	7:21	7:27		
401 miles	6:41	6:40	6:33	6:34	6:30	6:36	6:37	6:45	6:30	6:30	11:36	6:45	6:44	6:5														



REMARKABLE PICTURE SHOWING CLARK, ANDERSON AND HORAN TAKING THE CITY LIMITS TURN AFTER SPRINT

THE grand prix, which is an international event, and which is run under the sanction of the Automobile Club of America and not under the rules of the American Automobile Association, took place on Saturday before a crowd which was well over 100,000 strong, according to the official figures. Fully 10,000 people, which vast assemblage completely filled the immense grandstand, witnessed the finish of Caleb Bragg in his Fiat, who crossed the line, winner of the fourth annual race, averaging 69.3 miles an hour for the distance of about 410 miles, or fifty-two laps.

On the fifty-first round, Bragg was well ahead of de Palma who was running second, and who surely would have come in second, had he not met with accident almost on the eve of the finish. At the end of the fifty-first lap, Bragg was leading de Palma by 2 minutes 36 seconds, yet the latter determined to cut this down so that the balance would be on the other side of the ledger, if possible. On his fifty-first round, de Palma received instructions from the pit to speed up. Desperate, he drove like mad, taking the turns at a fearful clip. The crowd was all excitement, for there was a chance that the young Italian would win.

De Palma is Ditched

But just before Bragg arrived at the tape, the report came in without details that de Palma was in the ditch. None of those who heard the report was surprised, for all knew that de Palma was going at a fearful rate. The announcement was not given out to the crowd for fear of a stampede, and none suspected that an accident had happened until after Bragg had crossed the line the winner, running slowly. He stopped at the line and conversed with Starter Wagner, telling him all he knew of the accident. Yet the crowd did not suspect for several seconds; when it dawned upon them, cries

By L. V. Spencer

of "Where is de Palma?" "What has become of de Palma?" arose from the crowd. Still the news was kept quiet, and delivered only to the press stand, and was not given out until the race was over.

At station 11, which is on the North Fond Du Lac road, de Palma attempted to pass Bragg, but did not allow enough room to clear the other car, hitting the big Fiat with sufficient force to overturn his speeding Mercedes, throwing him and his mechanic Tom Alley out of the car. Their injuries, at first thought to be serious, did not prove so grave.

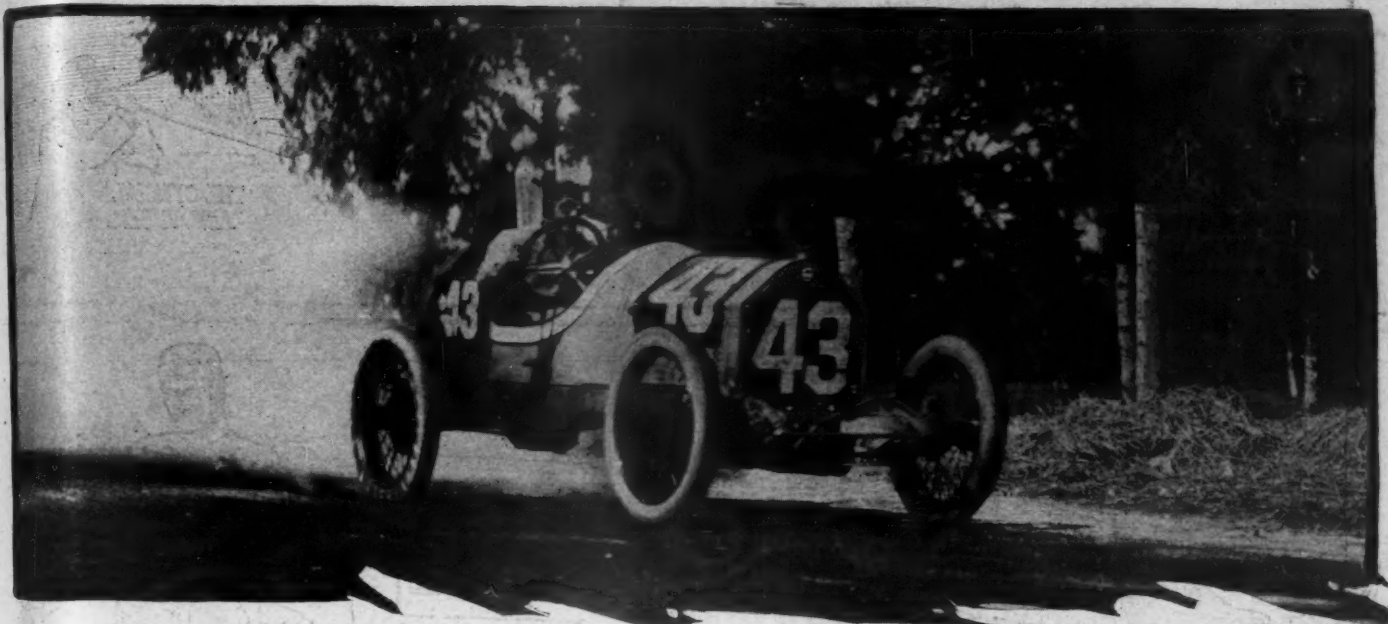
Throughout the long run of 410 miles there was plenty of excitement for the big crowd. There was an imposing line up of high-powered cars at the start. Out of the fourteen entries, there were twelve starters. One of those missing was Bruce-Brown, while the other was Mulford, whose Knox was not in shape for the race. Barney Oldfield was also on hand, having succeeded in getting a car—a Fiat—at the last minute.

Start of Grand Prix

Bob Burman, in Benz 31, was the first to get away, followed by Fontaine in a Lozier. Fontaine is a Milwaukee pilot, and he drove the same car which Nelson,



E. J. SCHROEDER, OWNER OF MERCEDES DE PALMA PILOTS AND GREAT DRIVER WHO WON ELGIN RACES AND VANDERBILT CUP



GIL ANDERSON IN STUTZ, ONLY AMERICAN CAR TO FINISH IN THE GRAND PRIX

its owner and entrant, drove in the Vanderbilt cup race of Wednesday. Next came Teddy Tetzlaff, demon driver of them all, at the wheel of Fiat 33. He was trailed by Hughie Hughes in the sturdy Mercer. The unlucky de Palma was off 30 seconds later in his Mercedes 35. Spencer Wishart, who drove a Mercer in the Pabst race of Friday, was in command of another Mercedes, No. 36. Clark was next off in Mercedes 39. Bergdoll, at the wheel of the immense Benz 40 followed. After him was Bragg, Fiat 41, who had withdrawn from the race following Bruce-Brown's death, but who was persuaded at the last minute to com-

pete. Benz 42, which was scheduled to be driven by Joe Dawson, winner at Indianapolis in June, was sent away by Horan instead. Gil Anderson in the Stutz, which looked small beside the immense foreign machines, got the word next, and last Oldfield in Fiat 44.

Tetzlaff in Lead

Tetzlaff took the lead in the first lap, with Bragg second and Bergdoll third. Wishart and de Palma were in fourth and fifth places, respectively, while the others came around in the following order: Burman, Hughes, Horan, Anderson, Fontaine, Clark and Oldfield. The latter would no doubt have shown up better on

this first circuit had he not been delayed by tire trouble. This was the first stop at the pits.

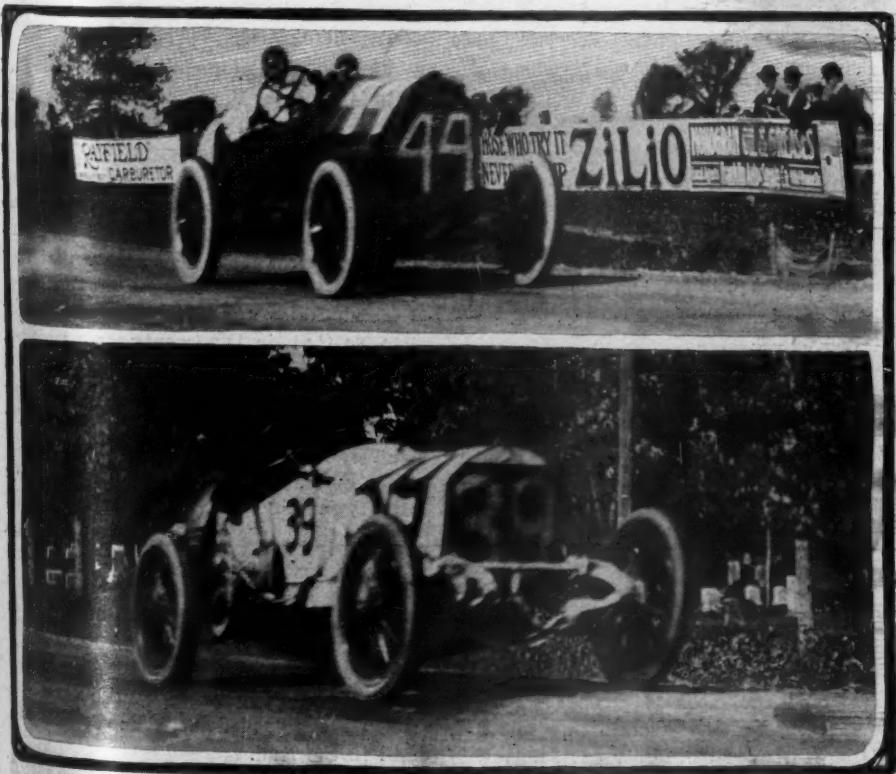
Returning to the race, the second lap saw only two shiftings of positions among the cars in the rear positions. Wishart took Bergdoll's place in third position, while Hughes overtook Burman, forcing the latter into seventh position and putting Hughes in sixth. All this time Tetzlaff was driving in his terrific, slam-bang style, much the same as he did in the Vanderbilt race of Wednesday. After completing his second lap, Burman stopped at the pit with engine trouble, the same trouble, by the way, which delayed the start of the race for 10 minutes. In his third lap, Burman was permanently out of the race, his Benz having succumbed to a broken piston.

Racers Shift Positions

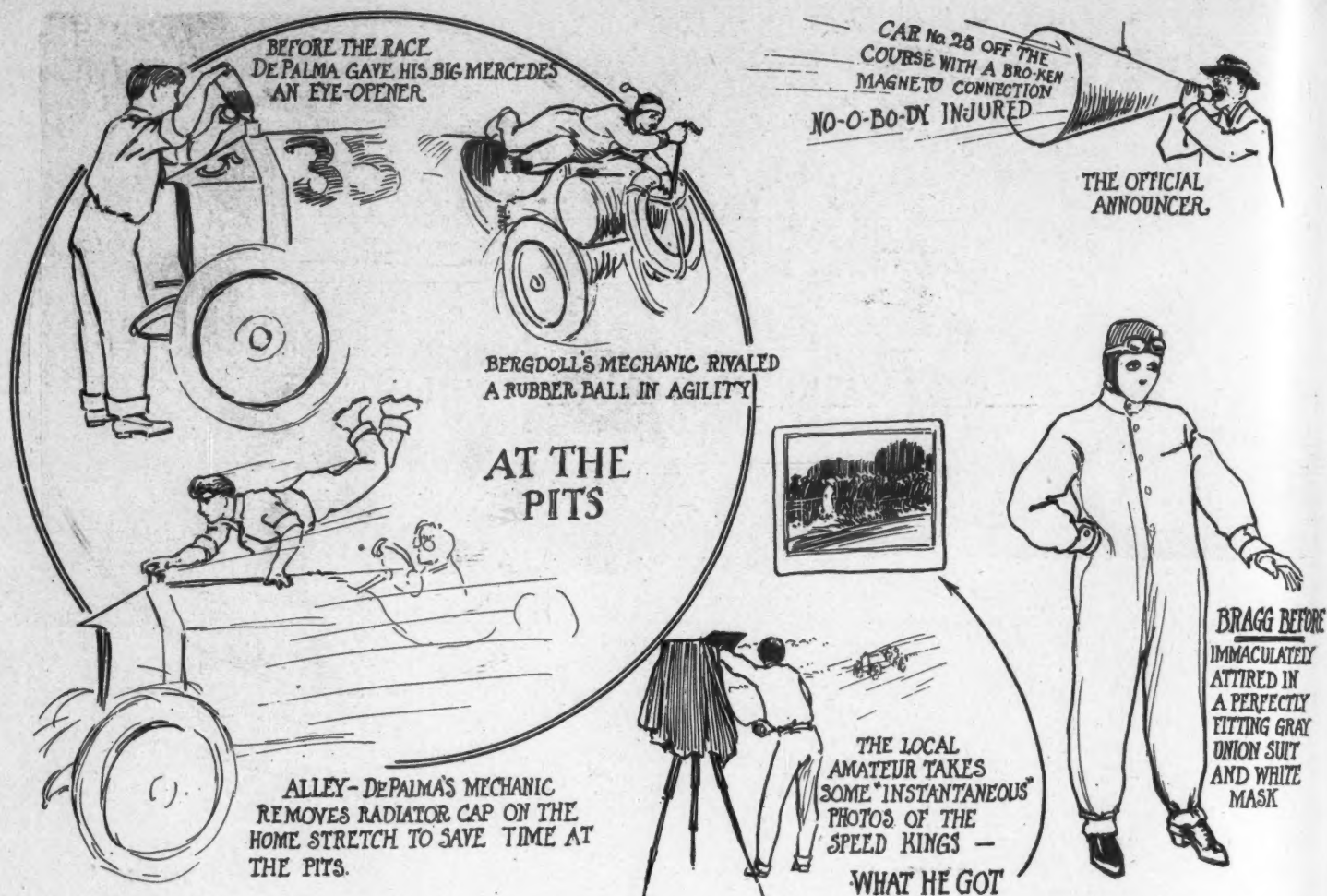
Burman out, Anderson came from ninth into seventh place, Hughes, who had to stop at his pit on his third lap to replace a spark plug, went back to last place at the end of the third. The shift brought Clark up to tenth, Oldfield having passed him and coming into the ninth place. Fontaine was running now in eighth place, while Horan became sixth. The leaders retained the same positions which they had held during the second lap.

The third was Wishart's last lap; in the fourth his motor was disabled with a broken crankshaft, a break which presages quick repair. Bergdoll now became third, while de Palma moved up to fourth place. Horan succeeded to fifth place, Anderson to sixth, Fontaine to seventh, Oldfield to eighth, Clark to ninth and Hughes to tenth. Tetzlaff, way in the lead, was reeling off the miles at a lively clip. There seemed to be no stopping him. clip with Bragg a good second.

The fifth lap saw no changes in the positions of the leaders, the only difference in the ten contenders being that



BARNEY OLDFIELD IN FIAT, WHO FINISHED FOURTH; GEORGE CLARK IN MERCEDES, WHO WAS GIVEN FIFTH PLACE



both Anderson and Fountaine passed Horan. The Stutz car came into Horan's old position at fifth, while the Lozier came up to sixth place.

In the sixth lap, Clark passed Oldfield, who was obliged to stop at his pit to replace a right rear tire. The veteran driver made quick work of the change, but he did not regain his lost position until the ninth lap. There was no other change in the line-up in the sixth lap, Tetzlaff still leading by a good margin and hotly pursued by Bragg, Bergdoll and de Palma.

De Palma Moves Up

It was in the seventh lap that de Palma snatched third place from Bergdoll, who stopped for fuel and an extra supply of tires to replace those used on the back stretch. This wait put Bergdoll back into sixth place, Fountaine and Anderson passing him as well as de Palma.

The eighth lap brought out no differences in the line-up, while in the ninth, the only position change was in Oldfield's taking eighth position from Clark. In this lap Fountaine went through the straw bales on the Fond du Lac road turn, but he was soon on the road again, no one having been hurt. The tenth saw no change except that Bergdoll, in the Benz, passed Fountaine.

In the eleventh, Tetzlaff made his first stop at the pit, thus giving his lead to Bragg, who was running nicely and whose car had performed so far without a hitch. Tetzlaff changed a right rear tire and was

soon away again in pursuit of Bragg. In this lap, Horan, who had been running seventh, passed Anderson, Bergdoll and Fountaine, and took fourth position momentarily, only to drop back to his old standing again on the following round. The Stutz car then took fifth place, Bergdoll sixth, and Fountaine seventh.

All this time de Palma was running third, and Anderson, except for the thirteenth lap when he was momentarily nosed out by Bergdoll, was in fourth position. In the fourteenth lap Bergdoll blew a tire on the back stretch at station 4 and the delay put the Benz entry into seventh position, both Oldfield and Fountaine passing it. Hughes was still worrying along in last place.

The fourteenth lap was Tetzlaff's fastest, and also the fastest lap ever covered over the Wauwatosa course, he making the circuit in 6 minutes 7 seconds, or at the average speed of 77.4 miles an hour. This hitting it up gave Teddy the lead again, which he held through the next lap, Bragg running consistently and but a few seconds behind. On lap seventeen, Tetzlaff made a pit stop which cost him 2 minutes 22 seconds and putting Bragg in the lead.

At the end of the seventeenth lap, the cars stood Bragg, Tetzlaff, de Palma, Anderson, Bergdoll, Fountaine, Oldfield, Clark, Horan. The Mercer car 34, Hughie Hughes, went out for good in this lap, leaving only nine cars still running. Hughes' car was disabled by a broken

gasoline line. Two laps previous to his withdrawal, Hughes' car threw a wheel at station 7, but the driver controlled the car, keeping it on the road. Another wheel was substituted, his car being equipped with the wire type.

Bragg Loses Lead

Through the twentieth lap, nothing of note took place, although on the next round Bragg lost his lead, which he had held from the seventeenth lap. He was obliged to stop at his pit for gasoline, and he changed both rear tires at the same time, losing in all 2 minutes. De Palma and Tetzlaff were both so close that they passed Bragg while he was stopped.

Tetzlaff also was forced to change a rear tire, so that, in the twenty-second circuit, de Palma was leading, with Tetzlaff second and Bragg still third. De Palma, now leading, had averaged 72 miles an hour for twenty-two laps.

De Palma retained the lead through the twenty-fourth lap with Tetzlaff second, Bragg third, Bergdoll fourth, Anderson fifth, Oldfield sixth, Clark seventh, and Horan eighth. But in the next lap, which was the twenty-fifth, Tetzlaff succeeded in nosing de Palma out of first position.

More delay at the pit on the twenty-sixth lap allowed Bragg to take second position from de Palma, while Tetzlaff was still in the lead.

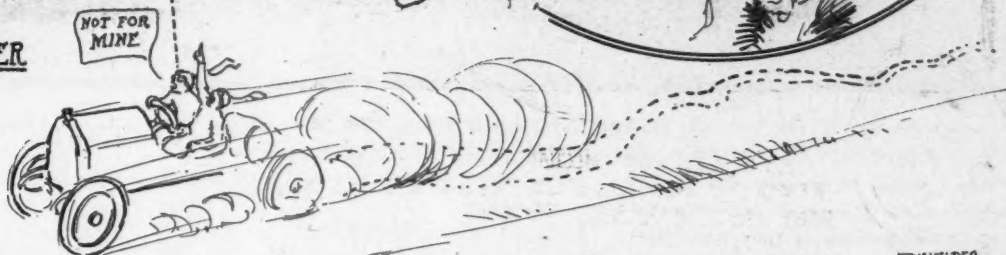
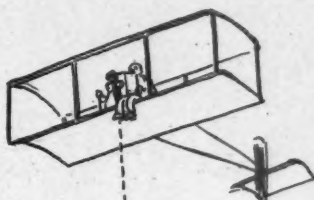
In the thirty-first lap it was seen that something was wrong with Tetzlaff, who, since he had regained the premier position,

OFF THE COURSE OILING
HIS ROCKER ARM

AGAIN THE
OFFICIAL
ANNOUNCER



BRAGG AFTER
NOT SO BEAUTIFUL
BUT
SOME
DRIVER



THE MOST
POPULAR WOMAN
IN THE GRAND
STAND



LUNCH
TIME

IRON WILDER

had been going at a lively pace. Finally, the car was seen coming down the track at a slow pace and it was found that Tetzlaff was permanently out of the race with a broken radius rod. With Tetzlaff's with-

drawal, seven cars remained in the struggle, the Lozier having gone out in the twenty-second lap with a sprung steering-knuckle.

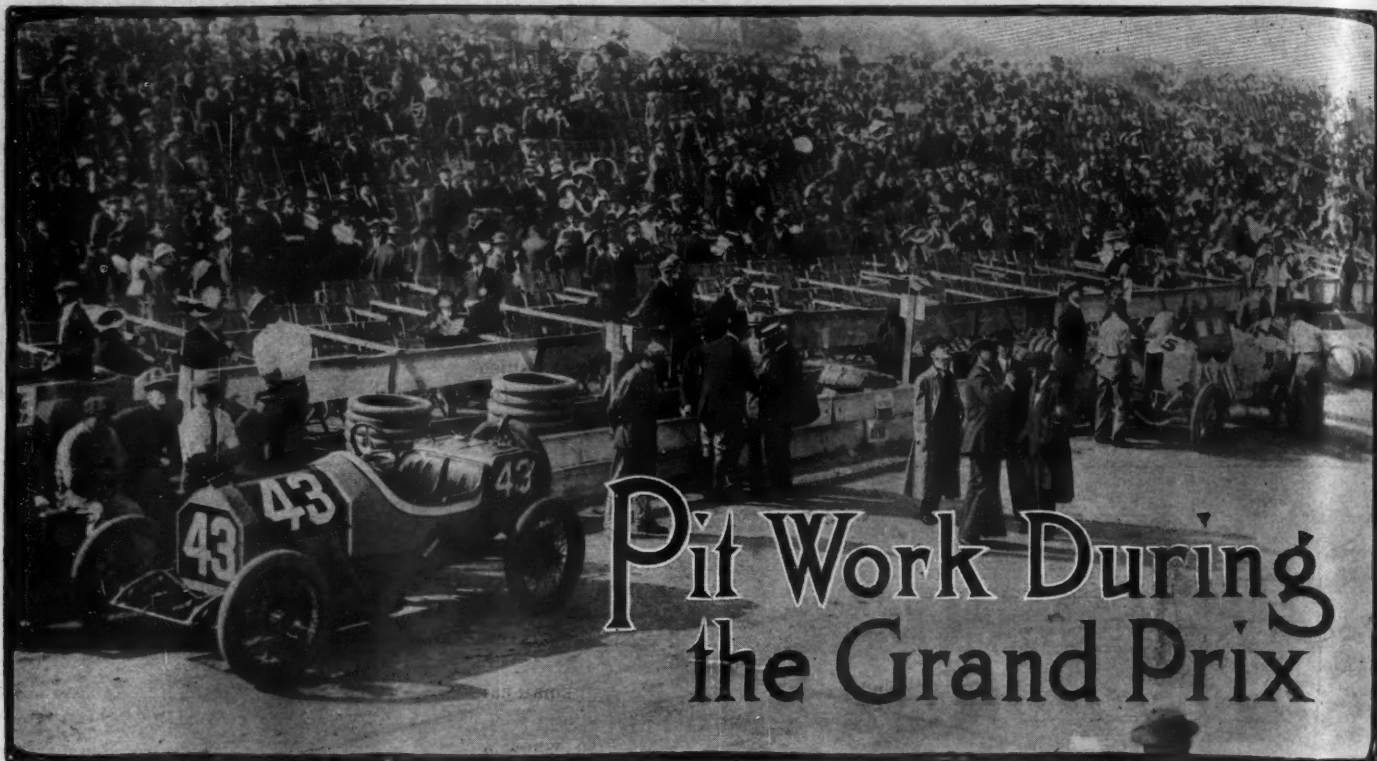
With Tetzlaff out Bragg came into first

place again, de Palma second, Bergdoll third, Anderson fourth, Oldfield fifth, Clark sixth, and Horan seventh. The rest of the race for first place was simply a struggle between Bragg and de Palma.

CYLINDER SIZES AND EQUIPMENT OF THE CARS CONTESTING IN THE 3-DAY RACES AT MILWAUKEE

VANDERBILT CUP RACE											
No.	Car	Driver	Bore	Stroke	Piston displacement	Magneto	Carbureter	Shock Absorber	Tires	Oil	Spark plugs
22	Mercedes	DePalma	5.2	7.06	644.6	Bosch	Rayfield	Mercedes	Michellinn	Monogram	Bosch
23	Mercer	Hughes	4.39	5	309.0	Bosch	Rayfield	Firestone	Michellinn	Monogram	Bosch
24	Knox	Mulford	4.8	5 1/2	597.0	Bosch	Rayfield	Mondex	Michellinn	Oilzum	Bosch
25	Lozier	Nelson	5 3/8	6	549.0	Bosch	Rayfield	Mondex	Michellinn	Wadham	Bosch
26	Mercedes	Wishart	5 1/8	7.06	590.0	Bosch	Rayfield	Mondex	Michellinn	Monogram	Bosch
27	Stutz	Anderson	4 3/4	5 1/2	389.9	Splitdorf	Schebler	Hartford	Goodyear	Monogram	Bosch
28	Mercedes	Clark	5 1/8	7.06	590.0	Bosch	Rayfield	Mercedes	Michellinn	Mobiloil	Red Head
29	Fiat	Tetzlaff	5	6 3/8	589.0	Bosch	Rayfield	Hartford	Miller	Oilzum	Bosch
GRAND PRIZE RACE											
31	Benz	Burman	5 3/8	6	549.0	Remy	Benz	.....	Firestone	Oilzum	Bosch
32	Lozier	Fontaine	5 3/8	7 1/2	589.0	Bosch	Rayfield	Mondex	Michellinn	Wadham	Bosch
33	Fiat	Tetzlaff	5 3/8	7 1/2	589.0	Bosch	Rayfield	Hartford	Miller	Oilzum	Bosch
34	Mercer	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
35	Mercedes	DePalma	5.2	7.06	644.6	Bosch	Rayfield	Mercedes	Michellinn	Monogram	Bosch
36	Mercedes	Wishart	5 1/8	7.06	590.0	Bosch	Rayfield	Hartford	Michellinn	Monogram	Bosch
39	Mercedes	Clark	5 1/8	7.06	590.0	Bosch	Rayfield	Hartford	Michellinn	Mobiloil	Red Head
40	Benz	Bergdoll	6.2	6.3	670.0	Bosch	Benz	.....	Fisk	Oilzum	Bosch
41	Fiat	Bragg	5 1/8	7 1/2	850.0	Bosch	Rayfield	Mondex	Michellinn	Monogram	Bosch
42	Benz	Horan	.....	.....	.....	Bosch	Rayfield	.....	Michellinn	Monogram	Bosch
43	Stutz	Anderson	4 3/4	5 1/2	389.0	Splitdorf	Schebler	Hartford	Goodyear	Monogram	Bosch
44	Fiat	Oldfield	5 1/8	7 1/2	850.0	Bosch	Rayfield	Mondex	Firestone	Oilzum	Bosch
WISCONSIN MOTOR CHALLENGE TROPHY											
2	Mason Special	Snyder	3 3/8	5	235.8	Splitdorf	Schebler	Hartford	Michellinn	Oilzum	.....
3	Mason Special	Mason	3 3/8	5	235.8	Splitdorf	Schebler	Hartford	Goodyear	Mobiloil	.....
5	Mason Special	Endicott	3 3/8	5	235.8	Splitdorf	Schebler	Mondex	Michellinn	Texaco	.....
FABST BLUE RIBBON TROPHY											
11	Case	Nikrent	4 23-64	5	447.8	Splitdorf	Rayfield	Mondex	Michellinn	Texaco	.....
12	Bergdoll	Rooney	4	5 1/8	406.5	Bosch	Rayfield	Hartford	Firestone	Texaco	Bosch
14	Mercer	Wishart	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch
15	Fal	Hastings	4 1/4	5 1/4	280.6	Splitdorf	Schebler	Hartford	Michellinn	Polarine	.....
16	Mason Special	Roberts	3 3/8	5	235.8	Splitdorf	Schebler	Hartford	Michellinn	Oilzum	Bosch
17	Mercer	Pullen	4 1/4	5	300.7	Bosch	Rayfield	Hartford	Firestone	Monogram	.....
18	Fal-Special	Chandler	4 1/4	5 1/4	280.6	Splitdorf	Rayfield	Hartford	Michellinn	Polarine	.....
19	Mercer	Hughes	4.39	5	309.0	Bosch	Rayfield	Hartford	Firestone	Monogram	Bosch

The Mercers and the Stutz used wire wheels, the former Rudge-Whitworth and the latter McCue



ANDERSON WITH THE STUTZ AND DE PALMA WITH THE MERCEDES WERE EARLY ARRIVALS AT THE PITS

ANNUAL grand prix races are unique from the standpoint of the observer of the work at the pits as they are international events while the others are national events. They are run, therefore, under the rules of the Automobile Club of America instead of under the A. A. A. rules which govern the national contests. The A. C. A. rules do not permit the pit men to render any assistance on the track to the contestants. That is, the driver and his mechanic must do all the work that becomes necessary about the car during the race. They must make all tire changes, and fill oil, water and fuel tanks as well as perform the actual mechanical adjustments. In the national races, pit attendants are permitted to change tires and replenish the supplies so the driver and mechanic are left free to do the mechanical work at the pits.

Special Pit Rules

The fact that the drivers and their mechanics were forced to do all the work about the car resulted in the stops at the pits requiring more time than is usual and probably cut down the average speed of the race quite materially. On the whole, however, the cars got away from the pits in shorter time than was to be expected under the circumstances, for the contestants worked like demons to cut down the time of the enforced stops. The grandstands had a chance to see the acme of team work of driver and mechanic.

When it was necessary to take on another spare tire to replace one that had been used at some other point on the course, the cars would come in to the pits with the drivers slackening speed, while the mechanic was stretched over the

By Darwin S. Hatch

tanks behind the seat unbuckling the straps that held on the spare tires and would have them loosened up ready to slap on the new spares before the car came to an abrupt stop. Several times cars came pounding down the stretch to the pits for water with the mechanic stretched full length over the hood, retaining his precarious position with one hand on the hood strap, while with the other removed the radiator cap.

Fast Work at Pits

The necessity for quick work at the pits resulted in several interesting arrangements for filling the fuel tanks. Bragg had the gasoline stored at his pit under pressure with a hose from the storage tank which was slipped into the fuel tank of his Fiat. Some of the others had small gasoline cans which could be up-ended into the tank without requiring a funnel. Two of the cars, the Stutz and Hughes' Mercer, were equipped with wire wheels in the hope of cutting down the number of tire changes and the time required to make them. Nor was any time lost in stopping and getting under way again, for the mechanic usually had leaped to the track before the car had come to a stop and nearly always had to make a flying leap to regain his seat after the driver had started.

There were in all thirty-eight stops at the pits, three of which were permanent. Of the thirty-five temporary halts, only six were for tire replacements alone, although in twenty of them advantage of the enforced stop for other causes was taken to replace worn tires or spares, or other things were done when tire changes be-

came necessary. As may be expected, the majority of the tire changes were on the right rear wheel which has the hardest service.

Stutz Makes Long Non-Stop Run

Anderson with his Stutz holds the palm for the longest non-stop run of the day. He made only two stops during the entire 410 miles of the race and ran the first 215 miles without a halt. He had no mechanical trouble, and he changed but one tire throughout the race, replacing the demountable wheel on the left rear in the twenty-seventh lap. At the same time, he took on gasoline and oil. His only other stop was on the next to the last lap when he refilled his gasoline tank.

Like Anderson, Bragg made only two stops, the first one being after he had run 166 miles, when he changed both rear tires and took on gasoline and oil. His other stop was at the end of the thirty-seventh lap when he refilled his supply tanks and changed the left rear tire. Bergdoll made but four stops; the first one to take on gasoline and replace a spare tire which had been changed on the back stretch, getting away in 46 seconds. When the race was half over he lost 3 minutes and 40 seconds at the pits in changing tires, renewing his supplies and tightening up shock absorbers. After running 30 miles more he stopped 45 seconds to put a strap around the fuel tank which was beginning to work loose. He stopped again for gasoline and a spare tire in the thirty-eighth lap and in the forty-third to put on two rear tires.

Barney Oldfield started the ball rolling at the pits, when, after his first circuit of the track, he replaced a rear tire. He had

not gotten away when Burman pulled up after completing 15 miles and adjusted the valves of his engine. He had not had time to properly tune up the engine before the race, in fact the start had been delayed 10 minutes to give him a chance to get it in order. Hughes stopped in his third lap to change spark plugs and again in the fourth for the same purpose. Then there was a lull at the pits till Oldfield drew up for another tire change.

Horan's Mechanic Is Excited

Tetzlaff stopped twice for tires and fuel after running 80 miles. Before he got away, Horan pulled up to replace a spare and take on gasoline, but waited to change a right rear tire. He had started out when the shouts from his pit told him that the jack had been left in the track in the excitement, and the mechanic did a record-breaking sprint back to pick it up. Even at that, Horan was away in less than 2 minutes. When the race was two-thirds over Horan lost 6 valuable minutes, for Burman, who relieved him, by running in on the rim from the back stretch where he had blown a tire. This damaged the wheel so that it had to be replaced by one from Burman's Benz.

De Palma holds the record for rapid tire change, when at his first stop in the twenty-fifth lap he replaced a tire in 37 seconds. At the end of his next circuit of the course the Italian stopped again, this time to put oil on the rocker arms. After another 15 miles he halted again and worked at his motor for nearly 4 minutes, adjusting the valves and removed a magneto wire that had caught on the carbureter lever. His last stop was made in the thirty-seventh lap for tire and water.

The record of Clark's Mercedes is nearly as good as that of the Stutz. Clark made but two stops, the first one being after running 190 miles, when he took on gasoline and oil. His second and last stop occurred in the thirty-fifth circuit of the course when he lost over 10 minutes in repairing a leak in the water-cooling system. Clark was the most fortunate so far as tire troubles were concerned, as he did not change a tire throughout the race.

Of the cars finishing in Thursday's races the Falcar was the only one to finish without trouble of any kind. Not a stop was made at the pits by Hastings, even to fill his tanks. Wishart in the Mercer ran 110 miles without a stop till he went out for good. Robert's Mason special, the winner of the larger class, made one stop on account of a broken gas lead. This was repaired by putting in a piece of hose. When he started out again, the car stopped after a few yards because he had forgotten to turn on the gasoline again.

Endicott, the winner of the small-car race, made two stops, the first one after one circuit of the course when a spark plug was changed. The other stop was in the seventeenth lap for gasoline. Mason, driving the Mason No. 3, an old stripped touring car, held the record of the day for stops, making five during the 173 miles of the Wisconsin trophy contest.

There were eight stops at the pits in the Pabst trophy race, only two of them for tire troubles. There were only two cases of mechanical trouble to the cars that finished. The other stops being for fuel, water and oil. Of the eight stops in the small-car race, only two were made on account of tire trouble.

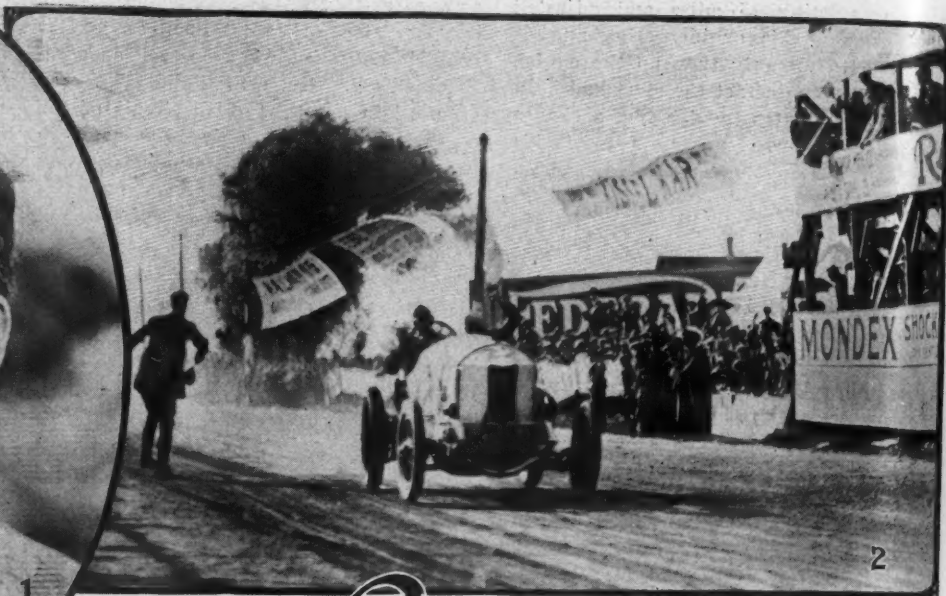
In general, Wednesday's race was remarkable for the lack of tire trouble encountered on such a new course and speaks well for the condition of the track. Although the early part of the race witnessed considerable tire trouble, the drivers settled down to a saner pace and their tires gave them more mileage during the latter portion of the contest. Of the thirty stops around the course, twenty-five of these were made at the pits and approximately half of them were caused by the necessity for tire replacement. What mechanical trouble developed was in nearly every case so serious as to put the contestant out of the race for good and all. These troubles are given in detail in last week's story of the event. Hughes was the first to make a stop, and this was when he changed a wheel at the pit. Mulford was held up on the back stretch on account of ignition trouble in the second lap. This caused another stop in the fifth lap ending in his withdrawal.

Pit Work Generally Good

The pit work as a whole, was very good, but was not to be compared for efficiency with that of the grand prix, considering the fact that in the latter, the drivers and mechanics had to do all of their own work. Much less time was lost at the pits than in the small car races of the day following. This was due to the better preparations and training of the pit men, and also to the fact that the drivers stopped their cars close to the pits, while the lighter cars on Thursday ran by their pit spaces, in a great many instances, and consumed much time in backing up to their proper position.



PIT SCENE BEFORE START OF GRAND PRIX, SHOWING BRAGG'S AND TETZLAFF'S FIATS



The Vanderbilt Cup



IN the issue of October 3 Motor Age told in detail of the running of the Vanderbilt cup race at Milwaukee October 2, story and tables being received by telegraph. Now Motor Age reproduces herewith interesting pictures of the struggle which returned as winner Ralph de Palma in the same Mercedes which he drove to victory at Elgin, winning the Chicago Automobile Club's Elgin trophy race and free-for-all. Illustrations on page 14 show the following:

- 1—Ralph de Palma, winner of the Vanderbilt
 - 2—Starter Wagner giving de Palma the checkered flag, denoting the finish of the race
 - 3—De Palma in Mercedes straightening up after having made a turn
 - 4—Cars lined up for the start of the Vanderbilt.
- No. 22 is de Palma's Mercedes and No. 23 Hughes' Mercer





Pictorially Told



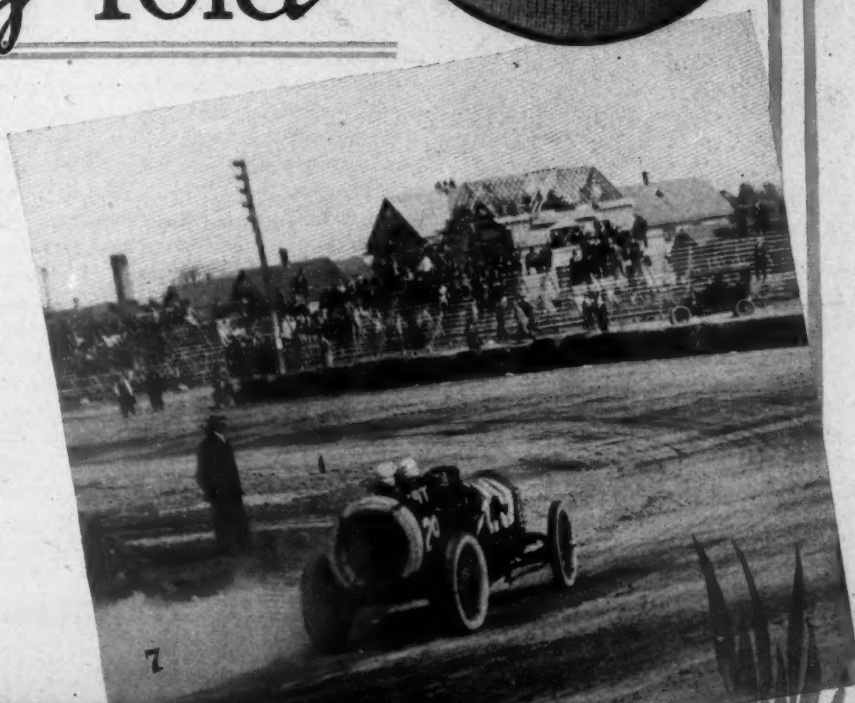
On page 15 are illustrations showing other incidents of the race, dealing principally with Hughes, runner-up, and Tetzlaff, who threatened to make a runaway of the race but who was put out after victory seemed certain. The Californian also encountered hard luck in the grand prix. The illustrations are as follows:

5—Hughes finishing the Vanderbilt in second place in a Mercer

6—Hugh Hughes, driver of the Mercer that finished second in the Vanderbilt, as he appeared after the race

7—Teddy Tetzlaff in the Fiat on City Limits turn, who led the field for twenty-six laps and looked an easy winner.

8—View of the grandstand and pits during the Vanderbilt, showing Hughes passing and headed for City Limits turn



Roberts in Mason Wins Pabst Trophy



MORTIMER ROBERTS, WINNER OF PABST CUP

MILWAUKEE, WIS., Oct. 4—The small-car races which were run off today, were a sort of anticlimax to the big Vanderbilt cup classic of Wednesday. These races were the Pabst Blue Ribbon trophy race for twenty-eight laps or 220 miles, 3,704 feet, and the Wisconsin Motor Challenge trophy event, which is for a shorter distance of twenty-two laps, or 173 miles, 2,156 feet.

Mortimer Roberts, driving a Mason

Falcar Second and Third in 231-300 Displacement Class at Milwaukee

By L. V. Spencer

special, romped away with the longer run, while the Wisconsin Challenge went to Harry Endicott, also driving a Mason car. Only two cars finished the Pabst race, these being Robert's Mason and Hastings' Falcar, the latter having averaged 52 miles an hour for the entire distance, while Roberts averaged 58.8 miles an hour.

Three Survive in Pabst

Although there were four prizes offered for the Pabst race, only three awards were made, the third place being given to Chandler, also driving a Falcar, after he had completed twenty-three of the twenty-eight laps. There was no other car running to which the fourth award could have been accorded. It was nearly dusk when Hastings crossed the tape for the twenty-eighth time, and it would have been impossible for Chandler, still 50 miles behind, to have driven the remaining 5 laps, owing to the growing darkness. Consequently, Starter Wagner gave him the checkered flag at about the same time that he signaled the other Falcar on its final lap.

The Wisconsin race had five entries, but at the appointed time, only the three Mason cars lined up for the twenty-two-lap run. Two of them finished the race, Endicott's No. 5, which came in first in the time of 186 minutes, 44.79 seconds, and Mason's No. 3, which required 222 minutes, 40.35 seconds to cover the distance of nearly 174 miles. After going for three laps, Snyder's Mason developed



PABST CUP WON BY DRIVER OF MASON

clutch trouble, which put it out of the race. In this race, too, an award went begging. The start of these races was delayed 1 hour 30 minutes by rain, but the mud rapidly disappeared. After three or four laps the cars were kicking up dust.

Eight cars lined up for the start of the Pabst event, which was run simul-



ROBERTS IN PABST CUP-WINNING MASON SWINGING INTO BACKSTRETCH AT CITY LIMITS TURN

Endicott Lands the Wisconsin Trophy

Masons Run First and Second in 161-230 Class Event at Milwaukee



WISCONSIN TROPHY WON BY MASON CAR

taneously with the Wisconsin race. Nikrent, driving a Case was the first to be sent off; following him, Rooney in a Bergdoll shot into motion. Then came Spencer Wishart, driving the first of the three Mercers entered in the event. After him Hastings in a Falcar was sent off, while Roberts, in Mason No. 16, was the fifth to feel Starter Wagner's pat on

the shoulder, which was the signal to start. Pullen, piloting the second Mercer was next away, then Chandler in Falcar No. 18 got the word. Chandler, it will be remembered, was mechanician for Mulford at the Elgin races this year, driving the last lap of the free-for-all race for the noted pilot after Mulford had been overcome by the intense heat and carried from his car. It was Chandler's first race as a driver, and while he had considerable hard luck with his car, nevertheless, he drove a good race. Hughie Hughes, veteran of several races, and winner of the Aurora trophy race at Elgin this year, was the last to get away in the third Mercer, and the crowd was with him.

Hughes drove the same car which he used on Wednesday in the Vanderbilt but in order to do this, he was obliged to change motors. The Vanderbilt cup race is limited to cars having piston displacements between 301 and 600 cubic inches, while the Pabst trophy race required that the piston displacements should not be over 300 cubic inches. The motor which a bore .017 inch greater than that of the engine used for the Pabst race. The former has a displacement which is just within the limits for the Vanderbilt, while the latter is slightly below 300 cubic inches.

Running of Pabst Race

On the first lap, Roberts took the lead, making the distance of nearly 8 miles in 7 minutes and 35 seconds. Hughes negotiated the premier lap just 10 seconds behind Roberts, while Pullen was third



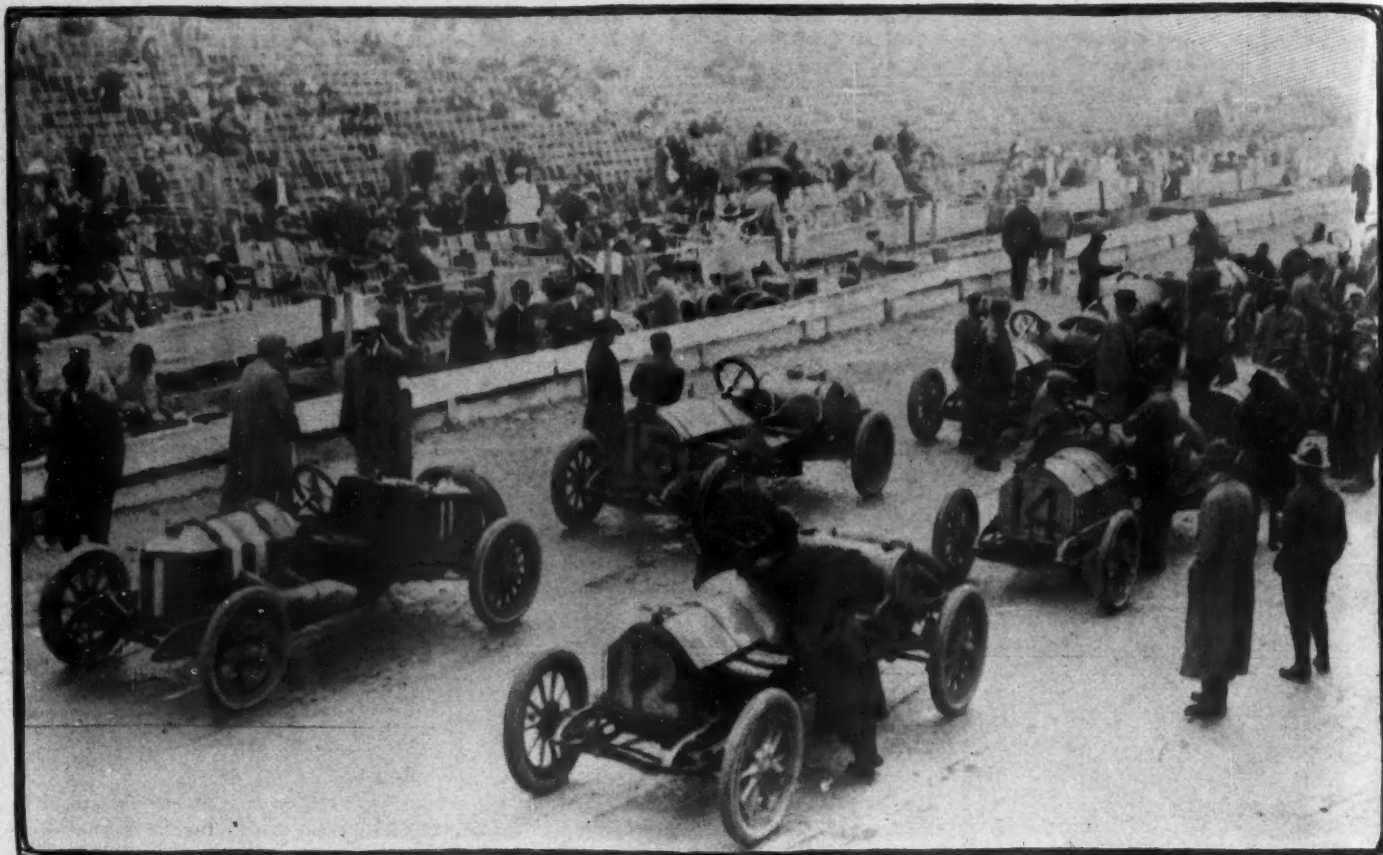
HARRY ENDICOTT, WINNER OF WISCONSIN TROPHY

in 7 minutes and 59 seconds. Nikrent in the Case was next, while Rooney, Chandler, Hastings and Wishart brought up the rear in the order named.

In the following circuit of the course, the leaders retained their same positions, and the only change in the eight cars' places was Wishart's nosing of Hastings out of the seventh position. This second lap was Rooney's fastest, he making the distance in 8 minutes and 1 second.



HARRY ENDICOTT IN MASON, FINISHING IN WISCONSIN TROPHY RACE



CARS LINED UP FOR START OF SMALL-CAR RACES AT MILWAUKEE THURSDAY

Roberts made this lap in 7 minutes and 14 seconds, 9 seconds faster than did Hughes who was in second place. The third lap, which proved to be Nikrent's fastest, saw no change in the relative positions of the speeding cars. Nikrent made the lap in 7:26, which was 8 seconds better than his first circuit.

In the fourth lap, Hughes slipped from

second place to fourth, owing to his being forced to stop at the pit for water. One of the water connections of his Mercer had been jarred loose, letting all the cooling water run out, and heating up his motor. Pullen who had made the lap in 7:32, now assumed second place, while Nikrent was a close third, being only 19 seconds behind. Wishart in this lap

nosed Chandler out of sixth position, while Hastings was bringing up the rear.

Two Cars Out

Hughes was off again at a lively clip, cutting down his rivals' lead at every turn. In the fifth lap he snatched the third place from Nikrent, who was having trouble, while Chandler came into fourth place. The fifth lap was the undoing of

TIMES OF ALL CONTESTANTS IN THE PABST BLUE RUBBON

No.	Car	Driver		1 7 miles 4658 feet	2 15 miles 4036 feet	3 23 miles 3414 feet	4 31 miles 2792 feet	5 39 miles 2170 feet	6 47 miles 1548 feet	7 55 miles 226 feet	8 63 miles 304 feet	9 70 miles 4962 feet	10 78 miles 4340 feet	11 86 miles 3922 feet
16	Mason—Special	Roberts	Elapsed time	7:35	14:49	22:12	29:28	36:48	44:05	51:21	58:34	65:43	77:48	89:53
			Lap time	7:35	7:14	7:23	7:16	7:20	7:17	7:16	7:13	7:09	12:05	8:55
15	F. A. L.—Special	Hastings	Elapsed time	10:06	19:49	32:45	42:26	51:29	60:16	69:12	77:50	86:34	95:06	103:51
			Lap time	10:06	9:43	12:56	9:41	9:03	8:47	8:54	8:38	8:44	8:32	8:36
18	F. A. L.—Special	Chandler	Elapsed time	9:32	18:25	27:13	35:58	44:16	53:32	62:20	71:07	79:52	88:31	97:05
			Lap time	9:32	8:53	8:48	8:45	8:18	9:16	8:48	8:47	8:45	8:39	8:39
17	Mercer	Pullen	Elapsed time	7:59	15:32	23:02	30:34	38:06	45:29	52:58	60:21	67:55	75:23	82:51
			Lap time	7:59	7:33	7:30	7:32	7:32	7:23	7:29	7:23	7:34	7:28	7:28
19	Mercer	Hughes	Elapsed time	7:45	15:08	22:29	33:03	40:37	47:50	54:59	62:09	69:11	76:15	83:19
			Lap time	7:45	7:23	7:21	10:34	7:34	7:13	7:09	7:10	7:02	7:04	7:04
14	Mercer	Wishart	Elapsed time	11:50	19:47	27:39	35:24	43:07	50:45	58:22	66:00	73:41	81:30	89:19
			Lap time	11:50	7:57	7:52	7:45	7:43	7:38	7:37	7:38	7:41	7:49	7:49
11	Case	Nikrent	Elapsed time	8:09	15:43	23:09	30:53	44:43	Out with broken crankcase					
			Lap time	8:09	7:34	7:26	7:44	13:50						
12	Bergdoll	Rooney	Elapsed time	8:16	16:17	25:26	34:57	43:06	Out with broken connecting rod					
			Lap time	8:16	8:01	9:09	9:31	8:09						

RESULTS OF THE WISCONSIN MOTOR TROPHY RACE

No.	Car	Driver		1 7 miles 4658 feet	2 15 miles 4036 feet	3 23 miles 3414 feet	4 31 miles 2792 feet	5 39 miles 2170 feet	6 47 miles 1548 feet	7 55 miles 326 feet	8 63 miles 1548 feet
5	Mason—Special	Endicott	Elapsed time....	12:15	20:11	27:59	35:38	43:07	50:51	59:04	67:04
			Lap time.....	12:15	7:56	7:48	7:38	7:29	7:44	8:13	8:40
3	Mason—Special	Mason	Elapsed time....	13:04	26:35	36:11	46:17	55:48	65:13	74:32	83:51
			Lap time.....	13:04	13:31	9:36	10:06	9:31	9:25	9:19	9:11
2	Mason—Special	Snyder	Elapsed time....	10:57	21:10	29:11	Out with clutch trouble				
			Lap time.....	10:57	10:13	8:01					

both Nikrent and Rooney, both of whom were forced to give up the struggle after completing about 40 miles. Nikrent's car was disabled by a cracked crankcase, while Rooney's Bergdoll snapped a connecting rod.

By this change of fortune, Wishart came into fourth standing, while Hastings became sixth, Chandler fifth, Hughes remained third, Pullen stayed second and Roberts was still first.

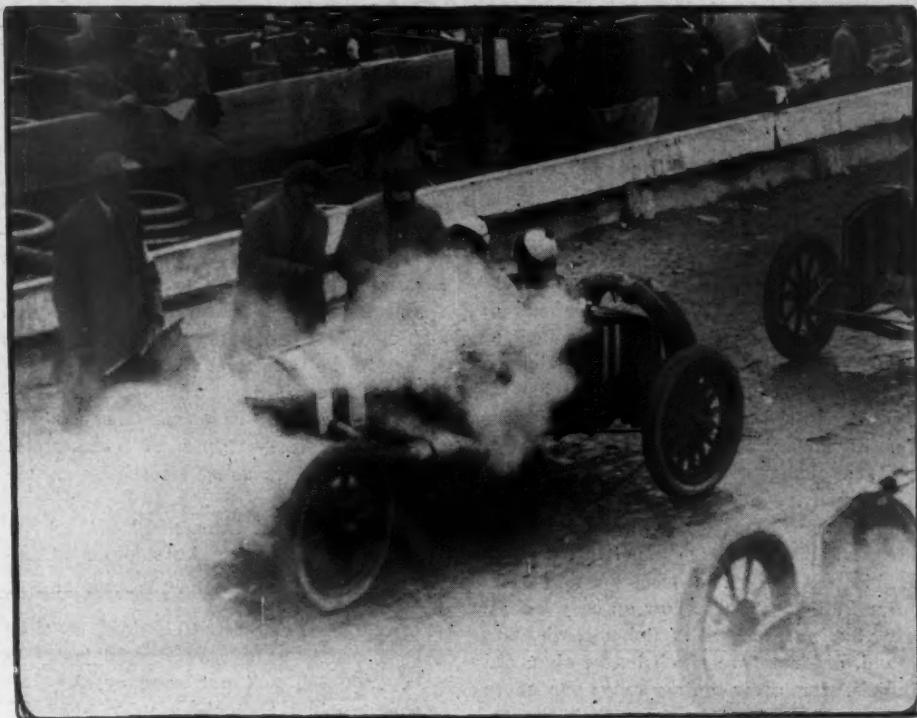
Pabst Cars in Trouble

For the sixth, seventh, eighth and ninth laps there was no change in the places of the contestants. Roberts was still leading. Hughes made the ninth in 7:02, which helped to put him in second place when Roberts was forced to stop on the back stretch to repair a break in the gasoline supply pipe of his Mason. He fixed it temporarily on the back stretch and ran in to the pit slowly, losing about 5 minutes, and thereby losing first place, which he had held from the start. Pullen succeeded to the premier position. For the next ten laps the race was a duel between Hughes and Pullen, both driving Mercers.

Forgets to Turn on Gasoline

Roberts got away, but just below the grandstand he stopped again. He had forgotten to turn on his gasoline, having shut it off when making the repair to the pipe at the pit. This was his last stop, except for a few seconds in the thirteenth lap on the back stretch.

Meanwhile, Hughes and Pullen were fighting it out to a finish, although the former was gaining rapidly on his teammates, and on the twelfth circuit he had passed his rival and was 4 seconds ahead. Hughes' average speed for eleven laps, or nearly 87 miles, was 62.12 miles an hour, while Pullen covered the same distance



NIKRENT IN CASE GETS THE WORD FROM STARTER WAGNER

slightly faster—62.6 miles an hour.

It was in the fifteenth lap that Wishart's Mercer gave out. From the eleventh lap up through the fourteenth he had been in third place about 6 minutes behind Pullen and Hughes and was making these rounds in good time, well over a mile a minute. But on the fifteenth round he was obliged to give up the struggle, for the crankshaft of his motor broke.

Wishart Out of the Race

At the end of the fifteenth lap the order was Hughes, Pullen, Roberts, Chandler and Hastings. The leader was tear-

ing off a few seconds at each round, making the fifteenth the fastest he had done so far in the race. His time for this lap was 6 minutes 58 seconds, or at an average speed of 67.9 miles an hour. The sixteenth lap Hughes negotiated in 6:53, which was the record for the day, at the rate of 68.7 miles an hour.

At the end of the sixteenth Pullen was less than a minute behind Hughes and was pushing the leader to the limit. But in the next round Hughes blew a tire, which put Pullen in the lead again by 15 seconds. Hughie did not stop to replace

TROPHY RACE FOR EACH LAP OF THE WAUWATOSA COURSE

	10 78 miles 4540 feet	11 80 miles 4600 feet	12 82 miles 4660 feet	13 102 miles 2474 feet	14 110 miles 1852 feet	15 118 miles 1230 feet	16 126 miles 608 feet	17 133 miles 5286 feet	18 141 miles 4644 feet	19 149 miles 4022 feet	20 157 miles 3400 feet	21 165 miles 2778 feet	22 173 miles 2156 feet	23 181 miles 1534 feet	24 189 miles 912 feet	25 197 miles 290 feet	26 204 miles 4948 feet	27 212 miles 4326 feet	28 220 miles 3704 feet	Position at finish	Miles per hour
77:48	90:30	92:30	94:30	110:16	117:27	124:34	131:44	138:50	145:58	153:05	160:10	167:10	174:18	181:29	189:08	197:38	207:08	216:32	225:08.71	1	58.8
12:05	7:15	7:15	7:15	9:56	7:11	7:07	7:10	7:06	7:08	7:07	7:05	7:00	7:18	7:11	7:39	8:30	9:30	9:24	8:36.71		
95:06	100:13	102:13	104:13	120:36	128:59	137:25	145:44	154:10	162:29	170:48	179:09	187:23	195:47	204:16	212:57	223:27	233:25	245:07	255:05	2	52.0
8:32	8:34	8:23	8:23	114:26	123:11	131:54	140:42	150:27	173:45	199:10	211:41	223:12	235:25	248:08	Stopped and given third place owing to darkness						
8:39	8:38	8:49	8:38	8:37	8:45	8:43	8:48	9:45	23:18	25:25	12:31	11:31	12:13	12:43	Out with broken gearset						
75:23	77:30	79:18	81:02	97:53	105:18	112:42	120:08	127:53	135:31	144:07	151:43	159:09	166:42	Out with broken universal joint							
76:15	77:30	78:45	79:57	7:31	7:25	7:24	7:26	7:45	7:38	8:36	7:36	7:26	7:33								
7:04	80:18	81:30	82:42	98:27	105:38	112:36	119:29	128:08	135:05	142:00	149:02	156:24									
81:30	82:42	83:54	85:06	8:09	7:11	6:58	6:53	8:39	6:57	6:55	7:02	7:22									
7:49	7:42	7:42	7:46	104:43	112:32	Out with broken crankshaft															

rod

AT MILWAUKEE, WIS., WON BY ENDICOTT IN A MASON

55 miles 926 feet	60 miles 1008 feet	65 miles 1090 feet	70 miles 1172 feet	75 miles 1254 feet	80 miles 1336 feet	85 miles 1418 feet	90 miles 1500 feet	95 miles 1582 feet	100 miles 1664 feet	105 miles 1746 feet	110 miles 1828 feet	115 miles 1910 feet	120 miles 1992 feet	125 miles 2074 feet	130 miles 2156 feet	135 miles 2238 feet	140 miles 2320 feet	145 miles 2402 feet	150 miles 2484 feet	155 miles 2566 feet	160 miles 2648 feet	165 miles 2730 feet	170 miles 2812 feet	175 miles 2894 feet	180 miles 2976 feet	185 miles 3058 feet	190 miles 3140 feet	195 miles 3222 feet	200 miles 3304 feet	205 miles 3386 feet	210 miles 3468 feet	215 miles 3550 feet	220 miles 3632 feet	225 miles 3714 feet	230 miles 3796 feet	235 miles 3878 feet	240 miles 3960 feet	245 miles 4042 feet	250 miles 4124 feet	255 miles 4206 feet	260 miles 4288 feet	265 miles 4370 feet	270 miles 4452 feet	275 miles 4534 feet	280 miles 4616 feet	285 miles 4698 feet	290 miles 4780 feet	295 miles 4862 feet	300 miles 4944 feet	305 miles 5026 feet	310 miles 5108 feet	315 miles 5190 feet	320 miles 5272 feet	325 miles 5354 feet	330 miles 5436 feet	335 miles 5518 feet	340 miles 5600 feet	345 miles 5682 feet	350 miles 5764 feet	355 miles 5846 feet	360 miles 5928 feet	365 miles 6010 feet	370 miles 6092 feet	375 miles 6174 feet	380 miles 6256 feet	385 miles 6338 feet	390 miles 6420 feet	395 miles 6502 feet	400 miles 6584 feet	405 miles 6666 feet	410 miles 6748 feet	415 miles 6830 feet	420 miles 6912 feet	425 miles 6994 feet	430 miles 7076 feet	435 miles 7158 feet	440 miles 7240 feet	445 miles 7322 feet	450 miles 7404 feet	455 miles 7486 feet	460 miles 7568 feet	465 miles 7650 feet	470 miles 7732 feet	475 miles 7814 feet	480 miles 7896 feet	485 miles 7978 feet	490 miles 8060 feet	495 miles 8142 feet	500 miles 8224 feet	505 miles 8306 feet	510 miles 8388 feet	515 miles 8470 feet	520 miles 8552 feet	525 miles 8634 feet	530 miles 8716 feet	535 miles 8798 feet	540 miles 8880 feet	545 miles 8962 feet	550 miles 9044 feet	555 miles 9126 feet	560 miles 9208 feet	565 miles 9290 feet	570 miles 9372 feet	575 miles 9454 feet	580 miles 9536 feet	585 miles 9618 feet	590 miles 9700 feet	595 miles 9782 feet	600 miles 9864 feet	605 miles 9946 feet	610 miles 10028 feet	615 miles 10110 feet	620 miles 10192 feet	625 miles 10274 feet	630 miles 10356 feet	635 miles 10438 feet	640 miles 10520 feet	645 miles 10602 feet	650 miles 10684 feet	655 miles 10766 feet	660 miles 10848 feet	665 miles 10930 feet	670 miles 11012 feet	675 miles 11094 feet	680 miles 11176 feet	685 miles 11258 feet	690 miles 11340 feet	695 miles 11422 feet	700 miles 11504 feet	705 miles 11586 feet	710 miles 11668 feet	715 miles 11750 feet	720 miles 11832 feet	725 miles 11914 feet	730 miles 12000 feet	735 miles 12080 feet	740 miles 12160 feet	745 miles 12240 feet	750 miles 12320 feet	755 miles 12400 feet	760 miles 12480 feet	765 miles 12560 feet	770 miles 12640 feet	775 miles 12720 feet	780 miles 12800 feet	785 miles 12880 feet	790 miles 12960 feet	795 miles 13040 feet	800 miles 13120 feet	805 miles 13200 feet	810 miles 13280 feet	815 miles 13360 feet	820 miles 13440 feet	825 miles 13520 feet	830 miles 13600 feet	835 miles 13680 feet	840 miles 13760 feet	845 miles 13840 feet	850 miles 13920 feet	855 miles 14000 feet	860 miles 14080 feet	865 miles 14160 feet	870 miles 14240 feet	875 miles 14320 feet	880 miles 14400 feet	885 miles 14480 feet	890 miles 14560 feet	895 miles 14640 feet	900 miles 14720 feet	905 miles 14800 feet	910 miles 14880 feet	915 miles 14960 feet	920 miles 15040 feet	925 miles 15120 feet	930 miles 15200 feet	935 miles 15280 feet	940 miles 15360 feet	945 miles 15440 feet	950 miles 15520 feet	955 miles 15600 feet	960 miles 15680 feet	965 miles 15760 feet	970 miles 15840 feet	975 miles 15920 feet	980 miles 16000 feet	985 miles 16080 feet	990 miles 16160 feet	995 miles 16240 feet	1000 miles 16320 feet																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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the damaged tire on the back stretch but drove on the rim to the pit. But Hughes was quickly up to speed again, making the eighteenth lap in 6:57. This put him again in the lead, Pullen's holding of the premier position being momentary only. Hughes was now 26 seconds ahead.

Hughie Hughes Goes Out

The Englishman lasted for three more laps, which he made in fast time. The nineteenth was made in 6:55, and it put Hughes a little over 2 minutes ahead of Pullen. Barring accident, it looked as if Hughes would repeat his Elgin victory. But in the twenty-second lap, he had to give way to the other Mercer driver, as his No. 19 Mercer had broken a universal joint, a damage which presaged immediate repair. With only seven laps to go and with a widening breach between himself and his nearest competitor, Pullen, Hughie was obliged to become a spectator.

But Pullen, who was now an easy leader, being 8 minutes ahead of Roberts, who was second, did not fare much better than did Hughes, for after going only one more lap, something went wrong with his transmission, and the trouble was of large enough proportions to prevent his finishing.

Mortimer Roberts, who had previously been running third, came into the limelight. When Pullen went out of the struggle Roberts was nearly 8 minutes behind, but nevertheless, he was so far ahead of the two Fals, which were the only other contenders, that there was never any doubt of the winner from the twenty-third lap on.

Chandler Returns to Race

In the twenty-third lap, the three cars running were the two Fals and the Mason, Hastings' Fal running a poor second to Roberts. Chandler was far in the rear. In the eighteenth lap, he had limped to his pit from somewhere on the back-stretch where a torsion rod had snapped. After standing at the pit for about 26 minutes while the break was repaired, and after giving up all thought of reentering the struggle, Starter Wagner sent Chandler off again, for he was sure of third money if he kept going. So he jogged along at his own pace.

Roberts finished the race in 225 minutes, 8.71 seconds, averaging 58.8 miles an hour for the 220 miles, while Hastings finished in 255 minutes, 5.1 seconds, averaging 52 miles an hour. When Hastings finished, it was getting dark, and the judges decided to flag Chandler and to give him third place without waiting for him to finish.

Much credit is due the little Mason car of Roberts' for its consistent going, and the Fal, though not exceedingly fast, should also be given credit for holding out. It seemed to be a day of breakdowns, and was a record which may perhaps never be equaled—out of eight entries only two finishing. The other cars should not be judged by their performance Thursday. All of them have brilliant records, and it merely was coincidence

Show Row Threatens in East

Electric Display to be Held in Grand Central Palace, New York, Likely to Bring About Clash with Automobile Board of Trade Because of Apparent Conflict

NEW YORK, Oct. 7.—The makings of a fine little row have developed over the forthcoming electric show which opens at Grand Central palace October 9. The title of the affair contains the words "automobile show" and it is the purpose of the exhibition company to display about forty types of commercial and pleasure cars using electricity as motive power.

This has proved interesting to the National Association of Automobile Manu-

facturers, which has the right to sanction or refuse sanction to national motor car shows. In case a manufacturer exhibits at an unsanctioned show he is automatically barred from participation in the regularly sanctioned affairs, under rules of the N. A. A. M.

According to announcement made on Friday, the N. A. A. M. has addressed notice to the management of the Grand Central palace, calling attention to the fact that the Automobile Board of Trade

which caused them to all lay down as they did. There is no car which will last forever, or which will not have breaks, but it was too bad that these numerous misfortunes should all come at the same time.

Little interest centered in the Wisconsin trophy race, which was all Harry Endicott. At the same time, he drove a heady race, and made good time with his little Mason. Mason, also driving a Mason car, was the only other car to finish the race, coming in far behind Endicott. Although there were five entries for the event, Kulick who was to have driven a Ford Special withdrew as did Heber whose entry was an E-M-F.

At the start, only the three Mason Specials were in evidence, Snyder in Mason No. 2 being the first to be sent off. Then Mason was started, while Endicott, in No. 5 was off last. Snyder's run-

ning was better than that of his two teammates for the first lap, but Endicott did not take long to head him off, and at the end of the second lap, he was way ahead of the other two. Mason was third, and the second place would undoubtedly have gone to Snyder, whose car is much faster than Mason's which is a remodelled touring car, had the former not developed clutch trouble in the fourth lap, which trouble proved to be so serious that Snyder had to withdraw in favor of the other two Masons.

Fast Time by Endicott

Endicott's fastest lap was his fifth, which was run in 7:29, and which is good going for a small machine. He made only two stops during the entire run of 173 miles, the first being on his first lap, when a spark plug was replaced. The other stop did not take place until the seventeenth round, when gasoline was taken on. No tire trouble developed for Endicott during the entire run.

Mason No. 3 stopped at the pit on its third lap for a tire change, losing time by skidding by the pit and having to back up. More tire trouble developed in Mason's fourth lap, but he was not obliged to slow down again at the pit until the thirteenth lap, when water, oil and fuel were taken on.

On his nineteenth lap, Mason again stopped for water, and at the same time oil was put into the crankcase. This car, which is cooled by the thermo-syphon system, proved that such a system is not adequate for racing conditions. The other Masons were provided with positive pump circulation and they were not troubled by excessive heating.

More oil and water were taken on by Mason in the twentieth lap, the radiator cap having been lost in this round, allowing much of the water to spill out. But Mason completed the last two laps without stop. Endicott's time for the run was 186 minutes 44.79 seconds, which was an average speed of 55.6 miles.

EACH DRIVER'S FASTEST LAP

No. Car	Driver	Lap Time	Lap in M.	Speed P. H.
Wisconsin Motor Challenge Trophy				
5 Mason	Endicott	7:29	5	63.2
3 Mason	Mason	9:13	14	51.3
2 Mason	Snyder	8:01	3	59.0
Pabst Trophy				
16 Mason	Roberts	7:00	21	67.6
15 F. A. L.	Hastings	8:16	21	57.3
18 F. A. L.	Chandler	8:18	5	57.0
17 Mercer	Pullen	7:23	6-8	60.0
19 Mercer	Hughes	6:53	16	68.7
14 Mercer	Wishart	7:37	7	62.1
11 Case	Nikrent	7:26	3	63.7
12 Bergdoll	Rooney	8:01	2	59.0
Vanderbilt Cup				
22 Mercedes	De Palma	6:31	17-25	72.6
23 Mercer	Hughes	6:33	5	72.3
26 Mercedes	Wishart	6:24	5	73.9
27 Stutz	Anderson	6:37	16	71.5
28 Mercedes	Clark	6:34	21	72.0
25 Lozier	Nelson	6:17	15	75.4
29 Fiat	Tetzlaff	6:15	2-4	75.7
24 Knox	Mulford	6:31	1	72.5
Grand Prix				
41 Fiat	Bragg	6:10	4-25	76.7
40 Benz	Bergdoll	6:20	4	74.8
43 Stutz	Anderson	6:10	19	76.7
44 Fiat	Oldfield	6:18	34	75.1
39 Mercedes	Clark	7:05	3	66.8
42 Benz	Horan	6:33	13	72.2
35 Mercedes	De Palma	6:25	34	73.8
33 Fiat	Tetzlaff	6:07	14	77.3
32 Lozier	Fountain	6:48	18	69.6
34 Mercer	Hughes	6:38	11	71.5
36 Mercedes	Wishart	6:20	2	74.8
31 Benz	Burman	6:42	2	70.6

New York Show Allotments

Automobile Board of Trade Announces There will be Eighty-Seven Different Makes of Pleasure Cars in Madison Square Garden and Grand Central Palace

holds a lease giving it the exclusive right to conduct motor car shows in the building during a term of years and notifying the management that the electric show comes within the scope of the lease.

The Electric Vehicle Association comes out flatly and announces that it does not care what action is taken with regard to sanction or otherwise on the part of the N. A. A. M. George F. Parker, manager of the show and vice-president of the association declares that it is a matter of small moment to the association or its members as they have always been dissatisfied with conditions at the national shows.

As far as pleasure cars are concerned the electric show will not be particularly affected by the ruling. Only two companies apparently are touched. These are the Buffalo electric and Hupp-Yeats. The former drew for space at the Automobile Board of Trade show and will also exhibit according to present plans, at the electrical show. The Hupp-Yeats is made by the manufacturers of the R. C. H., which will be displayed under the auspices of the A. B. of T. and while there is a question as to the possibility of getting cars to New York in time for the electrical affair, the intention of the company to display its models at the palace is enthusiastically admitted by the New York branch. The status of Studebaker also is attracting attention, as its gasoline lines certainly will be shown at the national shows and it is entered to participate in the electrical exposition.

But when it comes to the commercial vehicles, there is a different story to tell. The list of exhibitors at the Board of Trade show has not been announced and will not be formulated until next week. The Chicago show allotments have been made. In the list are Buffalo electric, Studebaker, Waverly, M and P. electric, General Vehicle and others. In the prospective list of exhibitors at the commercial show of the Board of Trade, most of the foregoing and a number of others are expected to take allotments.

Of course there will be some sort of a settlement reached, but in the meantime the situation is full of possibilities.

NEW MEMBERS OF N. A. A. M.

New York, Oct. 7—The following companies have been elected to membership in the National Association of Automobile Manufacturers: Borland & Grannis Co., Flanders Electric Co., Speedwell Motor Car Co., Michigan Buggy Co., McFarlan Carriage Co., Argo Mfg. Co., and the Broc Mfg. Co.

NEW YORK, Oct. 5—Allotments of space for the show which will be held at Madison Square garden and Grand Central palace under the auspices of the Automobile Board of Trade during the week commencing January 11 were made Thursday. The members of the Automobile Board of Trade will be housed at the garden and the other manufacturers will be represented at the palace. There will be eighty-seven different makes of pleasure cars shown, including forty-six at the garden and forty-one at the palace. Those who drew space at the garden for the coming show are as follows:

Olds, Lozier, Stoddard-Dayton, Oakland, Flanders, Franklin, Stearns, Pope, Stevens, Duryea, Peerless, Locomobile, Mitchell, Winton, Cadillac, Buick, Packard, Hudson, Maxwell, Overland, Pierce-Arrow, Chalmers, Reo, White, Cartecar, Warren, Marmon, Garford, Columbia, Moine, Thomas, Premier, Pullman, Alco, Jackson, Mercer, Auburn, Haynes, S. G. V., Cunningham, Knox, Moon, Matheson, Selden, National, Abbott-Detroit and Vellie.

It will be noted in the list above that the Alco, Auburn and Abbott are listed as members of the Automobile Board of Trade as they were elected to membership recently and have qualified. A number of additional applications for membership have been made and acted upon, but no announcement has yet been made as to who are included in the new list. The companies that will show at the palace are as follows:

Imperial, Cole, Inter-State, Case, Herreshoff, Kirt, Cutting, Kissel, Paige-Detroit, Speedwell, Pathfinder, Austin, Regal, Buffalo Electric, Flanders Electric, Columbus, Metz, Studebaker, Fiat, Hupmobile, Kline, Henderson, Michigan, Benz, R. C. H., Bergdol, Stutz, American, Rambler, Ohio, Crow, Edwards, Atlas, Lenox, Davis, Paterson, Marathon, Havers, Westcott, Only Car and Marlon.

The show spaces at the garden will be of the same size as last year, and all are taken. The plan of allotment among the members of the Board of Trade is based upon the amount of product turned out in the previous season, the largest producer getting first choice of space in the garden.

Among the exhibitors at the palace, division into two classes was made, the members of the N. A. A. M. constituting one and all others being classed together in the other.

Chicago show allotments made by the N. A. A. M. last week forecast the largest show ever held in the Windy City. While the total number of companies supplied with space on first allotment was slightly less than the total exhibit of last year, the overcrowding in some parts of the show building will be corrected by enlarging the spaces, thus accounting for the difference. At that, there are a dozen applicants waiting for space. The number of pleasure vehicle companies is about

equal to last year, the decrease so far being noted in the commercial vehicle section of the show. All the standard companies are represented, the absentees being mostly defunct.

ST. LOUIS SHOW OPENS

St. Louis, Mo., Oct. 8—The sixth annual St. Louis show opened last night. It is one of the largest shows ever held in this city, having eighty-three displays of pleasure and commercial cars and accessories. There are more than 350 1913 models on display, each exhibitor showing from one to eight cars. Over sixty-five different makes of cars are being shown. This includes all models of the gasoline and electric propelled vehicle. One of the local summer gardens is the scene of the show, and weather conditions which were ideal for the opening should attract one of the largest crowds that has ever before visited the shows which have been held here.

GROWTH OF THE S. A. E.

New York, Oct. 8—The fiscal year of the Society of Automobile Engineers ended October 1 and a preliminary statement of the membership growth of the organization shows that 505 members were added during the past season. On October 11, 1911, the S. A. E. had 900 members of all grades. On October 7, 1912, the roll had been increased to 1,405 and there is a list of applicants numbering fifty-five persons which will be acted upon at the forthcoming meeting of council.

MORGAN OUT OF INDUSTRY

New York, Oct. 7—Under the recent plan of reorganization adopted by the Morgan Motor Truck Co. of Worcester, Mass., Ralph L. Morgan, one of the pioneer engineers of the industry retires from the company. Mr. Morgan has issued no statement as to his future intentions and plans. The company will continue to make and market the commercial vehicle that has been its trade feature for a number of years.

WRIGHT QUITS KNOX COMPANY

Springfield, Mass., Oct. 5—W. E. Wright, vice-president and general manager of the Knox Automobile Co., has resigned as one of the results of the financial embarrassment of the company and the new management. Mr. Wright has been a prominent figure in the automobile world for a number of years. His plans for the future have not been announced.

STEARNS TO SELL KNIGHT MOTORS

Cleveland, O., Oct. 8—Formal announcement was made today by the F. B. Stearns Co. that it is prepared to manufacture Silent Knight motors for the trade, which right is given it under the agreement with Knight & Kilbourne. The Stearns company has been making its plans to do this for the last 6 months by adding to the capacity of its plant. It is said negotiations with several concerns are now on.

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AUTUMN TOURING

The October day with its warm Indian-summer sunshine, with its hillsides clothed in robes of many colors, with its sleepy haze hanging over upland and lowland, with its brilliancy of crimson and scarlet and with its clear blue skies, is the tourist's ideal.

Spring has its raptures, its rippling brooks awakened from winter silence, soft music of birds whose voices piped under southern skies during winter's long regime, the rainbow tints of Nature's carpet spread o'er vale and hill, and budding life on every hand—all pregnant with one great universal sentiment, Nature's great life for one more year.

The heat of summer has its joys: To those who seek surcease from heated offices, to those who seek the farthest lake and island for the holiday, to those who find their ideal by the wooded shore or beach where Ocean's endless roll bears constant message of eternity, it is that well-earned repose twixt life's long toil of year and year.

The short week-end snatched from Indian summer's hand is a leaf torn from the book of health; the motor outing along the woodland, ablaze with the glories wrought by early frost, drives from the brain the carking cares of work; the speedy spurt down the smooth road in the clear exhilarating air is inspiration to the business mind; and out door Autumn life engenders mental forces, stimulates physical life and steels the worker for the winter and its load.

The Season in Speed

THE season of 1912 has closed with a pall: Death and accidents as the curtain was falling have cast a gloom from coast to coast. From the drivers' roster have been erased one of the brightest names ever registered thereon; after other names have been made the marks of accidents. New stars have taken their place among the brilliancies in the constellations of speed; others who shone brightly a year ago are in eclipse; Fortune has turned her strange wheel and with its turning some have risen, some fallen.

THE year has not been so brilliant as last year: Fate has been a little unkind. Unity has been lacking: The herculean effort of the eleventh hour has been too conspicuous. Makers have been at sixes and sevens. Many wanted to race but had misgivings. "One's afraid and the other dare not," sums up the situation.

MANUFACTURERS were anything but united on the support of contests. In the early spring every day brought rumors of "returning to racing." Today one big company was building a fleet of racing machines; tomorrow it was another concern. As spring gave way to summer, optimism gave way to pessimism. Entry blanks through the mails failed to bring the looked-for check and the filled-cut blank. Follow-up letters and more blanks were succeeded by an ominous silence. Night lettergrams went responseless. Personal letters, special solicitors to factories—all fell short of a year previous.

THE rescuer was the private owner and the new maker. The gentleman enthusiast with his fast racing car and his professional driver saved the day. He entered at Indianapolis, in Santa Monica, he entered in Elgin, he entered in Tacoma and he entered in Milwaukee. With him entered the young bloods—those factories new in field but out to win their spurs, out to demonstrate to the fraternity that they were foemen worthy of their steel—cars built to the minute, creations combining fleetness, reliability, and little weight.

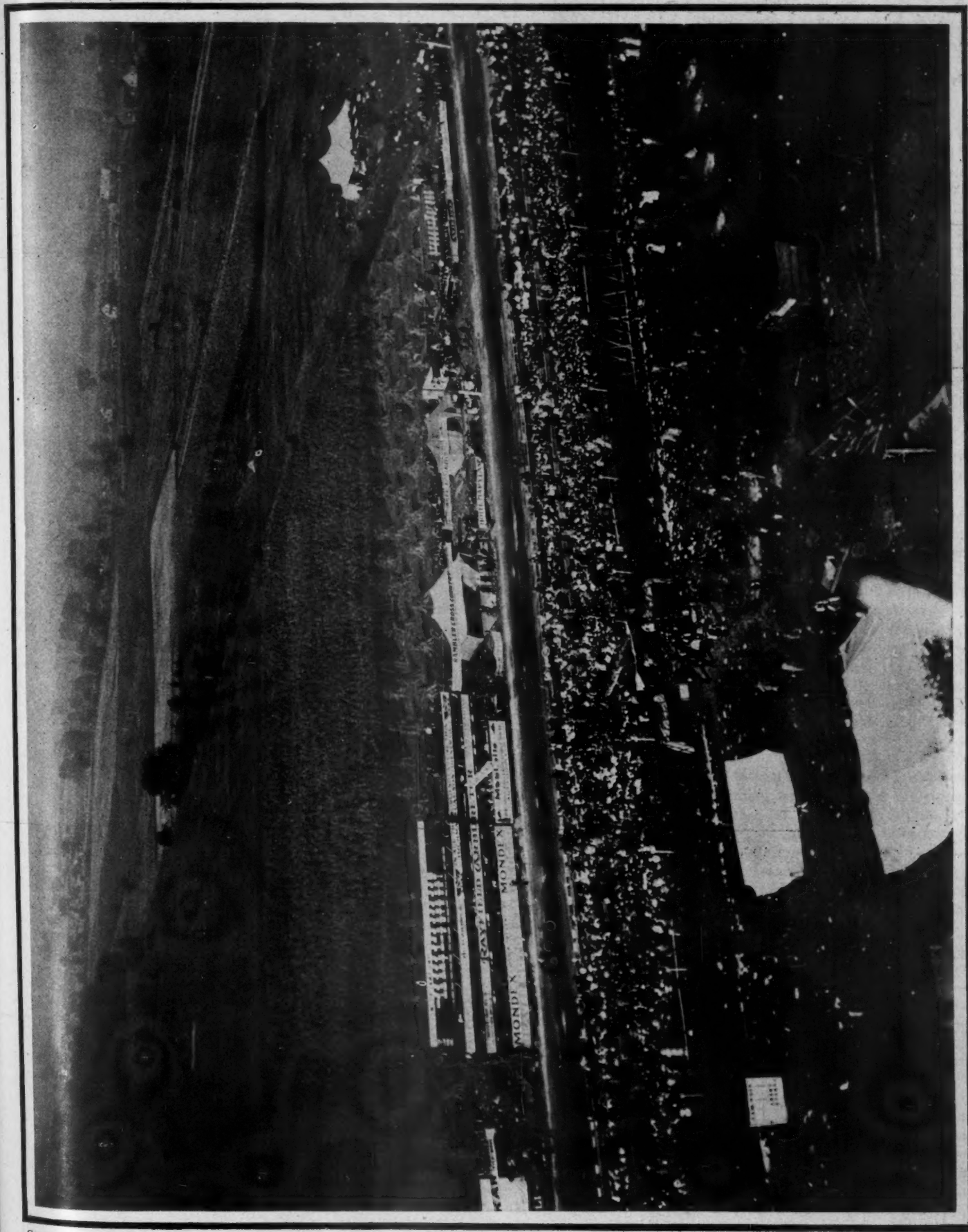
BUT if entries have been lacking enthusiasm has been on the ascent. Doubting Thomases shook their heads. "No entries, no interest, no attendance, racing is dead." Once more optimism triumphed over pessimism. Race morning brought the crowds, bigger than ever before, more select than ever before, more representative of Best America than ever before.

IN nearly every meet new records have been established. Higher speedway marks have been set; not a few of the road meets have added miles to the marks of 12 months ago; in a meet or two the marks of last year have not been reached; but history will record that racing in 1912 has played its part in keeping before the American millions the ever-conquering motor car.

THE American car builder owes much to those enthusiasts who have given freely of time and money to keep the sport of kings before the nation. The contests have sold cars, the contests have kindled enthusiasm, the contests have helped good roads, they have done good. Many makers are selfish: In the years when they were young they craved contests, they needed them to develop their product, they needed them to advertise it. Today they will not lend their passive effort; they antagonize, they work to thwart; they play the "dog in the manger" role.

CONTESTS will continue—racing has yet years to live. The Long Islands of yesterday are the Elgins of today and the Dallases of tomorrow. Savannah gives way to Milwaukee, and Santa Monica to Tacoma. It is a never-ending cycle of change, but through it all goes that great invigorating influence on the industry, which the maker needs, and which if he cannot actively support he should passively accept.

Road Race as Seen from an Aeroplane



Copyrighted by Wagner & Durborough, Chicago

A most remarkable feature of the Milwaukee meet was that moving pictures of the grand prix were taken from an aeroplane handled by Far-num Fish. Fred Wagner, of Chicago, was the photographer, and one of his pictures is reproduced herewith, showing the stand and course, the first time, it is believed, a photograph of a road race ever has been taken from an aeroplane

Conflicting Stories About 1913 Races

MILWAUKEE, Wis., Oct. 8.—The Vanderbilt cup, grand prix, Pabst and Wisconsin Challenge trophy races will be run on the Wauwatosa course in Milwaukee county next year, and the dates of the second running of the international road racing classics probably will be the last week of August or the first week of September. While the Milwaukee Automobile Dealers' Association, promoter of the 1912 classics, will be a principal in the management of Milwaukee's second speed carnival, the burden of responsibility probably will be borne by a stock corporation, composed of the principal commercial, business, civic and social organizations of Milwaukee.

This much is said to have been decided upon already. No definite announcement of the plans for the next year's races will be made until the M. A. D. A. has completed its work of closing up the business of the cup racing enterprise of October 2, 3 and 5—and that will take a couple of weeks at least.

Dealers Lose \$25,000

An executive session of the M. A. D. A. was held at its offices in the Sentinel building last night, and it was announced that the international road races positively would be held in Milwaukee next year, despite the heavy deficit which the M. A. D. A. faces as the result of conducting the events last week. There are no figures available tonight which give any idea of the amount of the deficit, because not all bills have been scheduled, and checking of receipts from all sources has not been completed. However, it is believed that the dealers stand to lose not less than \$25,000 on the venture. The \$25,000 represents approximately the cost of the postponements made necessary, in the first instance, by the failure to complete the course on time, and in the second instance, by a spell of rainfall of 5 days' duration, which not only made racing impossible but ruined the course so it had to be almost entirely rebuilt.

The financial requisition for 1913 appears to consist principally of enough money to improve the course, guarantee a prize list which will outshine even the \$20,500 handed out last week, and take care of the incidental expenses of management. It developed only during the coroner's inquest over Bruce-Brown's death that approximately \$40,000 was expended in all in building the Wauwatosa course, which today is the equal of most road racing courses, but needs finishing touches that should not exceed \$10,000 in cost. The recommendations of the coroner that the road be widened, the edges made correct, and the crown hard, smooth and even, seem to sum up any of the needs of the course at this time. It is safe to say that the promoter of the

Milwaukee Expects to Repeat; Vanderbilt Says No Deal Has Been Made

VANDERBILT DENIES MILWAUKEE DEAL

New York, Oct. 9.—Despite announcements made in the press that a contract has been made between the Milwaukee Automobile Dealers' Association and the Motor Cups Holding Co., which controls the Vanderbilt cup and the grand prize gold cup, providing for the holding of the classics at Milwaukee for a term of years, the report is flatly denied by William K. Vanderbilt, Jr., of the Holding company, donor of the Vanderbilt cup, and the American Automobile Association, under whose auspices the Vanderbilt cup races are run. He likewise denies any knowledge of the alleged contract.

next road races in Milwaukee will be obliged to meet the coroner's requirement that the course be complete and ready for racing at least 6 months before races are actually held. It is ready for racing now, but if work is started at once and carried on through the winter, as weather permits, and the bulk done early in the spring, the Wauwatosa course will be the best in the world and the fastest.

There are many explanations extant as concerns the cause of the accident to Ralph de Palma on his final lap in the grand prix. Caleb Bragg, who is most directly concerned, claims that de Palma burst a tire, which caused his big Mercedes to swerve and get beyond his control. This explanation is generally accepted. Until the Italian driver is well enough to be consulted, his version will not be known. He is resting easily and while not out of danger, his physicians are confident of his recovery. De Palma's most serious injury is a puncture of the abdomen. It was at first believed that his hip was broken, but this developed into a cut about 10 inches long, down to the hip bone, probably resulting from being thrown against the wire fence with tremendous force. He sustained deep cuts in his chin and about the body. Tom Alley, his mechanic, left the hospital Sunday afternoon with his left arm in a sling. His shoulder was badly wrenched and his collarbone was fractured.

Bragg's Version of Accident

Bragg states that de Palma must have known that the No. 41 Fiat had a lead of better than 2½ minutes on him and that there was hardly a chance of winning. The Italian was driving as one possessed, and there is a possibility that he mistook his pit signals and gave the car all it could take to make sure of second place. However that may be, witnesses declare that de Palma rounded the hairpin turn at greater speed than was his custom, and shot down South Fond du Lac road at a rate that sliced off a few feet of Bragg's lead every second. Bragg took the knoll midway between hairpin and graveyard turns at his usual cautious speed, and as

de Palma reached it a few seconds later, his car took a leap off the ground such as no car in the race had made. Three hundred feet beyond there is a culvert with a 3-foot iron railing, and at a point 60 feet behind this de Palma caught Bragg. There was a thud and the gray Mercedes slewed around, its long nose in the grassy bank, the body of the car athwart the road.

Bragg believes de Palma burst a tire when he landed on the ground after taking the knoll and lost control of the big car, which plunged down the road and hit the Fiat in the rear. De Palma's knowledge of the course, which at this point is rather narrow, leads Bragg to believe that he could not have intended to pass him there, with a culvert ahead.

Neither the officials nor the public lays a whit of the blame for the mishap to the grand prix winner.

Coroner Renders Verdict

That the American Automobile Association be compelled to formulate laws governing road construction for racing purposes; that such course must be at least 6 months old; that the edges of same shall be surveyed; that the physical composition of such course shall consist of the proper percentage of crushed stone, sand, cement and oil; that the crown be smooth and hard and even, and that the minimum width of such course at any given point shall be no less than 25 feet wide, which can be entirely used for driving purposes, and that curves shall be at a safe angle, are the recommendations of Coroner H. L. Nahin, of Milwaukee county, in his verdict on the death of David L. Bruce-Brown, of New York, racing driver, who died as the result of injuries sustained in an accident during practice on the Wauwatosa course on October 1.

Coroner Nahin lays no blame on anyone for the fatal accident, but states in his verdict that had the course been constructed on a more solid foundation, the crown smoother and harder, and the course wider and the edges more even, the catastrophe might have been avoided.

To carry out his recommendations that the governing body of motor racing formulate rules for construction of courses, the coroner suggests that a committee consisting of competent drivers and road constructors be appointed by the American Automobile Association to examine a given course, as well as the conditions of the racing machines before any racing is permitted on such course.

The coroner's verdict says that from the testimony adduced it appears that the course was newly built, that the foundation in some places was spongy, that the course was entirely too narrow for two machines to pass, and that the surface was rough and soft.

Car Salesmen Listen to Sage Advice

A careful review of the testimony shows that it was the almost unanimous opinion of the drivers who were summoned as witnesses that the course was in good condition, and that the cause of the accident was a tire blowout.

The death on Tuesday of Antonio Scudalari, mechanic for Bruce-Brown, probably will require only a formal inquest, the verdict of which will be the same as that on the ill-fated driver. Scudalari was 27 years of age and had been Bruce-Brown's mechanic for 4 years, helping him win the grand prix races of 1910 and 1911.

WORKING ON INSURANCE PROBLEM

New York, Oct. 9—Special telegram—In an effort to bring order out of the present chaos pertaining to motor car insurance and to inject an element of competition that will work for more reasonable rates, the National Motor Indemnity Co. and the National Motor Insurance Co. have been chartered at Albany. The former concern will insure against motor car collisions, property damage and liability, and the latter will cover fire, explosion and marine hazards. The managements will be identical and the policies issued will be contained in one document if convenient and losses will be handled through one adjustment department. A number of prominent men in the industry are named among the incorporators of the companies, among whom are the following: William E. Metzger, A. G. Batchelder, Hugh Chalmers, Thomas Henderson, Albert C. Pope, Alfred Reeves, S. A. Miles, Winfred J. Foss, Edwin B. Jackson, A. F. Maltbie, George W. Hipple and Chester I. Campbell. William B. Joyce, president of the National Surety Co., will be chairman of the executive committee.

The companies will be affiliated with the Motor Union Insurance Co. of Great Britain, which has an intimate connection with the Motor Union, the big organization of car owners of Britain that corresponds with the American Automobile Association in the United States.

OWNERS IN RELIABILITY RUN

St. Louis, Mo., Oct. 5—Twenty-seven cars competed in the fifth annual owners' reliability tour conducted by the Automobile Club of St. Louis, today. All the cars but one finished the distance of 110.2 miles.

In class A, H. Ahrens, driving a Franklin touring car, finished with a score of 993, winning the Barnard trophy. S. S. Pingree was second with his Amplex, having a score of 991.

In class B, E. A. Limberg, driving a Locomobile, was first with a score of 998. James Hagerman, Jr., driving a Marmon, was second with a score of 993. Limberg won the Pingree trophy.

Convention at Indianapolis Attracts 400 Members of Motor Industry

INDIANAPOLIS, Ind., Oct. 8—Special telegram—Four hundred car dealers, members of the selling organizations of the motor car concerns of the country, and advertising agents, gathered in the auditorium of the Claypool hotel, this city, at the opening session this afternoon of the first general sales convention of motor car dealers, following a luncheon tendered to the visitors by the Mahin Advertising Co., of Chicago. Many prominent dealers, manufacturers and advertising men are here for the 2-day meeting.

Believing that the future of the motor car industry hinges upon the sales education of the dealer and thereby on the ability of both the selling organizations and advertising departments to intensify retail sales, men in this field of the industry responded eagerly to the suggestion of J. J. Cole, of the Cole Motor Car Co., that a convention of this nature be launched in Indianapolis, second only to Detroit in the motor field.

Everyone Enthusiastic

"Intensity" is the slogan of the gathering. Naturally, everything rests with the dealer, for if he fails, all fail; and so the main objects of the convention are to teach the dealer how best to increase his sales and to impress upon him the need for absolute co-operation with the factory whose car he sells. Almost all American cars of today are good ones and will stand rigid investigations, and it only remains to get them before the people in a business-like way. An enormous growth of the motor car industry should result from the present concerted movement for a combined effort to sell cars to the people.

W. D. Nesbit, of the Mahin company, presided at the session, during which six speeches were heard, the first of which was an address of welcome by J. J. Cole in behalf of the city of Indianapolis. The idea of helping the dealer in all his problems is worthy of all the efforts the car manufacturer can give, he said. H. O. Smith, president of the Premier Motor Car Mfg. Co., was the next to talk. The selling problem is the big one, not only with the motor car but with every branch of business, he said. A good dealer can hold up a poor car a good while, but a poor dealer cannot uphold a good car very long. Mr. Smith stated emphatically that there is nothing today which even promises to rival the motor car as a solver of the transportation problem. To increase sales, educate the salesmen, he said, it is most important of the dealer to select the best selling line for his particular territory. Further, he must have confidence in his

line else he cannot hope to enthrone his prospects over what he has to sell.

C. F. Kettering, of Dayton, O., spoke on some of the human interest sides of salesmanship. Motor cars have become so common, he said, that we have slipped somewhat away from calling to the attention of those who do not know about such things what wonderful pieces of mechanism they are. Thousands still look upon them as experiments and to sell to such it is necessary to get them interested in the motor car's development. Relate in a human interest way the story of the manufacture of a tire, of a gear or of any other part of the car's makeup and you have the man interested. Do not say that he must lubricate a certain part, but show him the result of not doing so. Get the novice to understand the mechanical reasons for doing his or that and you not only have a satisfied customer but he will return to you when in the market again.

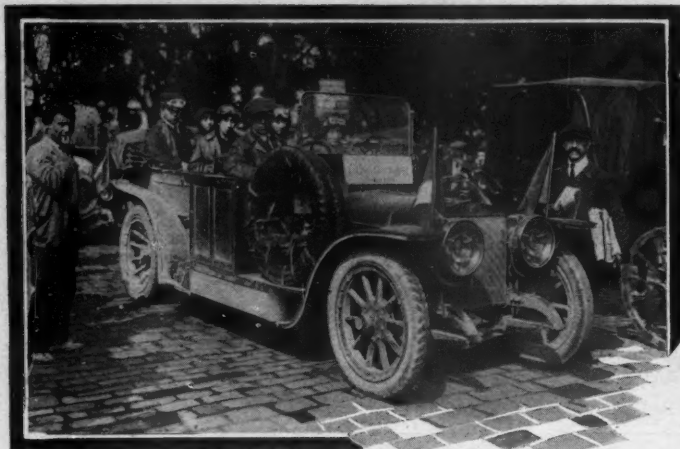
Leroy Pelletier, advertising director of the Flanders interests, gave a most entertaining talk on the co-ordination of advertising and sales. He is strongly in favor of conventions such as this, he stated, and said further that the main idea of the gathering is for every man to learn to boost for the product in the sales in which he is interested. The competitor who gives him the greatest run is the one he admires.

Mr. Pelletier believes that when we get a perfect co-ordination between the advertising and sales ends of a concern there is nothing which that concern cannot do. It is hard for the dealer to realize that the national advertising campaign is for his benefit, but this is the case, although it is a selfish interest which the car maker has in him, for dealers' sales mean factory sales. It is important for the dealer to know just what has been said in the advertising, otherwise he cannot talk intelligently to those who come in response to such advertising. There is not a large percentage of good salesmanship in the motor car business according to Pelletier. The adding machine and the cash register salesmen are much better at it, for the only reason which the factories recognize that not to secure an order from a prospective customer is death of the customer. The repair man should be a consummate salesman, and not a knocker, as it is too often the case.

Pelletier Makes a Prediction

Speaking further of the convention, he said that the ideal cannot fail because it is a good one. Next year the attendance will be much greater.

Charles A. Bookwalter, former mayor of the city was the next to speak. He traced the evolution of the motor car from the ancient means of transportation down to the present almost perfect car.



GREGOIRE CARAVAN AND HISPANO-SUIZA, WINNERS IN SAN SEBASTIAN RALLY

Gregoire Wins European Motor Rally

SAN SEBASTIAN, Sept. 27—Out of the 100 competitors, a Gregoire caravan won first place in the European rally ending at San Sebastian. The Gregoire people were wise enough to see that in order to win this competition they must carry the greatest possible number of passengers, travel the greatest distance and have the smallest possible motor. They therefore selected one of their semi-racing types of chassis, having a high-efficiency grand prix type motor and sent it to Posen, in Poland, to make a run of 1,470 miles, ending at the Spanish holiday resort.

The chassis was specially trussed with a view to carrying eleven persons, representing with their baggage, accessories, and bodywork, a load of about 3 tons. With a keen eye to business the Gregoire company equipped this chassis with a caravan body bought for a few dollars from a band of wandering gypsies. With all the accessories, such as chimney, flower pots, bird cage, sweeping brushes, bundles of rags, etc., the combination was so strange that the police were required to keep the spectators back in nearly every town passed through. The crew, consisting of Driver Porporato, the Gregoire agent in Berlin, his wife and relatives, entered into the spirit of the movement, transforming themselves into wandering gypsies, and on arrival at San Sebastian driving through the town with banjoists seated on the roof of their caravan.

The rally regulations provided that a start should be made from various European cities on given dates, the competitors uniting at Bordeaux, then proceeding in a group to San Sebastian. They had to maintain a commercial average of 19 miles an hour and about 240 miles a day. For every 100 kilometers they received 4 points; for every passenger, 5 points; for every 100 kilogrammes in weight, 1 point; for a closed body, 8 points; and for an open body, 3 points. To equalize chances, deductions were made as follows: For every liter cylinder area, 10 points; for

Unique Competition to San Sebastian Brings Out Many Starters

every kilometer less than average imposed, 2 points.

To get advantage of the mileage points nearly all the competitors sought to start as far away from San Sebastian as possible. Results showed that the rules were such that the short-distance tourists had little chance of being well placed. The necessity of running out to a distant starting point necessarily increased the mileage, many of the cars covering 1,000 miles before officially beginning the run. There were exceptionally few failures to meet the minimum requirements, for over sixty cars made the trip from such points as St. Petersburg, Warsaw, Berlin, Amsterdam, Vienna, Milan, Brussels, etc., without a loss of points, and their final position could only be determined after careful weighing and calculation. The Gregoire, heading the list with 144.9 points, was followed by a Hispano-Suiza with 116.6 points, a Berliet with 108.7, a Laurent-Klement with 104.5, an Apollo with 101.1, and 60 others in decreasing value.

The feature of the tour was the small size of the motors in view of the big load carried and the long distance covered. Intended primarily as an advertising scheme for the town of San Sebastian, the rally had the valuable quality of showing

up the regularity of cars under long-distance touring conditions and of revealing what can be done with motors of really very small dimensions. The accompanying table, giving the particulars of the first ten cars only, shows the distance covered and the approximate load carried. The exact weights have not been published.

In addition to these, fifty-two others were classed, among them being a Ford car, the only American competitor in the rally. A few days before the start of the event some changes were made in the rules; as notification of these could not reach Russia before the departure of competitors from St. Petersburg, a separate list of awards was made for all those having started the run from Russian territory. Under this heading the winner was a Metallurgique car of 3.5 by 5.5 inches bore and stroke, covering a distance of 2,225 miles in its run from St. Petersburg, and securing 163 points, the highest number given to any competitor. The car had a torpedo touring body with five persons aboard. The second under the heading was a Russo-Baltique, of 4 by 5.1 inches bore and stroke, driven by M. Nagel, with six other persons aboard, also coming from St. Petersburg, and winning 152 points. The third was a similar car with only two passengers, also from St. Petersburg, and winning 96 points.

On the arrival at San Sebastian, an elegance competition was held, when the inside-steering Delage, having won eighth

ORDER OF AWARDS MADE IN SAN SEBASTIAN MOTOR RALLY

Car	Bore & Stroke	Starting Point	Miles	Body	Passengers	Points
Gregoire	3.1x5.9	Poland	1470	Caravan	11	144.9
Hispano	3.1x7	Warsaw	1640	Torpedo	4	116.6
Berliet	2.7x3.9	Berlin	1304	Berlin	4	108.7
Laurin	2.7x4.3	Vienna	1320	Torpedo	4	104.5
Apollo	3 x4.6	Koenigsberg	1660	Touring	6	101.1
Berliet	3.9x5.5	Vienna	1320	Limousine	4	98.1
Simplica	2.7x3.9	Berlin	1304	Touring	4	97.1
Delage	2.9x4.7	Amsterdam	1052	Berlin	4	88.5
Sava	3.1x5.5	Brussels	907	Torpedo	6	77.58
Metallurgique	4 x5.9	Brussels	907	Coupe	5	77.55

place on the general list, was awarded the first prize for elegant appearance, being followed by the Metallurgique coupé hailing from Brussels, a similar car from Berlin, a Scap, a Gregoire inside-steering, and a Scar. In the open car section the first prize winner was M. Aschoff's Metallurgique torpedo.

A hill-climbing competition also was open to all the rally competitors, divided into three classes, two of them being for open cars, two for closed cars, and one for cars without any limitation. In the small section of the open cars the fastest was Porporato's Gregoire, which with its caravan body had carried eleven persons across Europe. It covered the 3 kilometers of winding gradient averaging 10 per cent, and having a number of difficult turns, in 4 minutes 31½ seconds.

In the big touring car class the first prize winner was a Rolls-Royce in 4:33½, second being a Delaunay-Belleville, followed by a Turcat-Merey, and a Scap.

BELGIUM HOLDS ROAD RACE

Spa, Belgium, Sept. 27—Speed, regularity, and endurance were the determining factors in the 269-mile race in the Belgian Ardennes. Unable to obtain the exclusive use of the set of roads, the route was divided into twelve sections, of which eight had to be covered on a regularity basis according to cylinder area, and four at speed; of these four there were three straight sections and a difficult climb.

Some very high speeds were maintained by the small racing and touring cars, and under the formula the small motors had an advantage over the big ones, for although these latter were the fastest they did not succeed in winning high places on the list of awards.

In the racing section highest points were won by Wery's Nagent, a four-cylinder of 2.7 by 4.8 inches bore and stroke, whose time for the four speed sections of respectively 7, 9, 4 and 8-mile stretches was 63.1, 64.1, 63.3 and 52.1 miles an

hour. This last time represents the hill-climb. Second place went to a Mathis of 2.7 by 4.7 inches bore and stroke, third to an Alfa-Legia of 2.5 by 3.9, and fourth to Christiaens six-cylinder grand prix Excelsior. This car was the fastest in the meeting, its highest average being 93 miles an hour, but it was at a disadvantage on the regularity sections, where an unusually high average speed had to be maintained on roads open to all kinds of traffic.

In the touring classes Germany had all the glory, Joerns in an Opel winning first place, followed by Erle in a Benz, De Crawhez in a Mercedes, and Wilford in a Benz. Belgian cars, Sava, Fab, Hermes and Imperia made a good showing; French cars were not very well represented and two Flanders were classed respectively twenty-first and twenty-sixth.

In the hill-climb the awards were made on the total of three attempts, the distance of each climb being 3.1 miles and the average gradient 6 per cent. The fastest work was done by Christiaens in the six-cylinder Excelsior; total time, 9 minutes 4-15 seconds. The winners in the respective racing classes were Wery, Nagent, 13:07%, and Elskamp, Mercedes, 11:15%. Among the tourists Wilford in the Benz put up the finest performance, his totalized time being 11:34%, easily defeating Erle's Benz in this class. The other class winners were de Crawhez, Mercedes, 11:58%; Kryn, Sava, 17:00%; Joerns, Opel, 14:40%.

UNITED MOTORS' ANNOUNCEMENT

New York, Oct. 9—Special telegram—According to authoritative information, the plan of reorganization of the United States Motor Co. has been settled. The merchandise creditors, represented by an active committee, have labored steadily for weeks to reach an equitable basis that would prove acceptable to all classes of claim holders and under the plan formulated it is understood that the following main facts will be covered:

All the existing securities of the company, amounting to about \$11,500,000 of preferred, \$12,200,000 common and \$6,000,000 debentures will be wiped out and new securities will be issued in their places; in addition \$130,000 of the preferred stock of the Columbia Motor Car Co. and \$118,000 of the common will be subjected to the same treatment. The basis of the new issue will be an assessment of \$24 a share on the common and preferred stocks of the United States Motor Co. and the Columbia Co. as outlined.

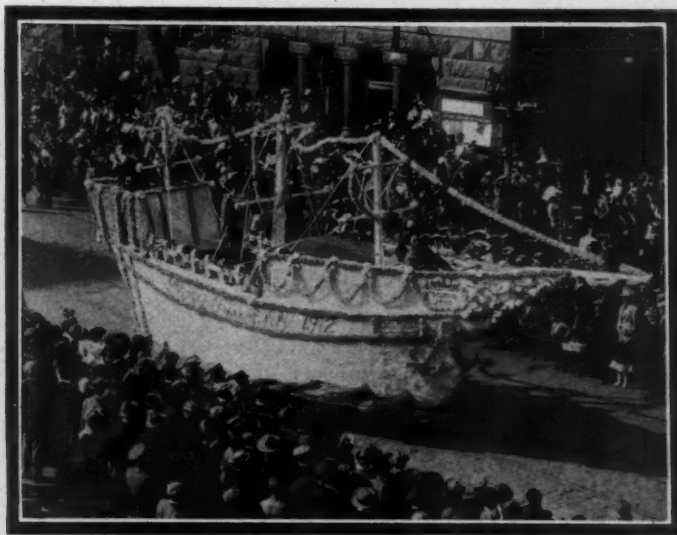
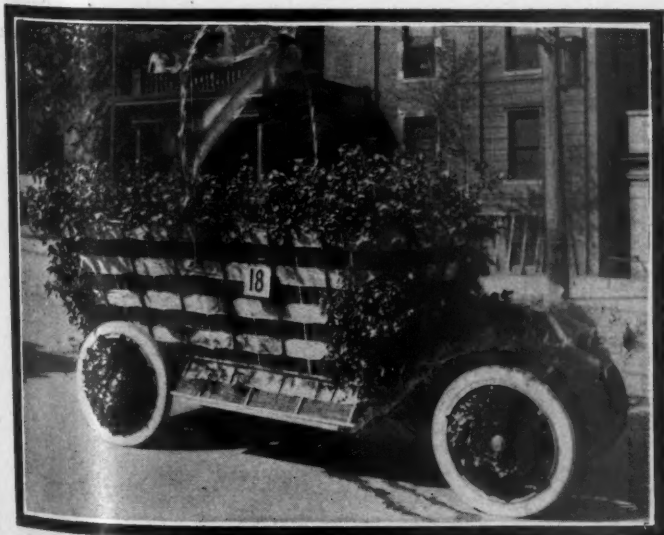
The total capitalization will be scaled down as follows: For and in consideration of the \$24 a share the new company will issue in exchange for the preferred certificates 24 per cent of new first preferred 25 per cent of second preferred and 30 per cent of common. For the common certificates outstanding on payment of all assessment of \$24 a share the new company will issue 24 per cent of first preferred, 17½ per cent of second preferred and 30 per cent of common. This assessment means that the new company will start out with a clear capital for working operations of about \$3,000,000. It is proposed to raise by this method the sum of \$5,720,000. The remainder will be used for funding the matured obligations. At this time there is still remaining in the treasury of the company the sum of \$1,000,000. The disposition of this fund was one of the chief matters in contention in the long, painstaking deliberations of the merchandise creditors.

At first it was proposed that the creditors of the various companies that had supplied parts, materials, etc., should receive any cash allotment. Then the proportion offered was raised to 10 per cent. Neither of these early proposals was considered as equitable by the creditors and a counter demand was made for 30 per cent.

This was refused by the general creditors as including the banking claimholders, and a compromise was reached by which the merchandise creditors will receive 25 per cent of their claims in cash, 25 per cent in first preferred, 25 per cent in second preferred and 15 per cent in common, thus making a settlement of approximately 90 cents on the dollar. While the agreement will not be announced until next week as to the details, the main facts are assuredly contained as above.

OMAHA HOLDS BIG PARADE

Omaha, Neb., Oct. 5—There were forty pleasure cars and motor trucks entered in the floral parade, which was one feature of the Ak-Sar-Ben festivities in Omaha last week. In the class for most beautiful cars, that of Mrs. Emma B. Manchester, decorated with pink roses and maiden hair fern on a field of white, took first prize; second, Thomas McShane, car decorated with oak leaves, hollyhocks and asparagus fern; third, Omaha Taxi Co., built in shape of throne, with two little tots driving with crimson reins; fourth, M. C. Peters, a debutante's car, covered with white and decorated with apple blossoms.



OMAHA PRIZE WINNERS—MRS. F. J. HARRINGTON'S CAR, DECLARED TO BE OF MOST UNIQUE DESIGN, AND COLUMBUS' SHIP THAT WON TRUCK HONORS

Erle Climbs Hill at 101.5 Miles Per Hour

PARIS, Oct. 6—This year's Gaillon hill-climb, which has just been run brought great satisfaction to the spectators, due to the splendid performance of the winning Benz, driven by Fritz Erle, who finished in 22 seconds, breaking his own record of 23 seconds, which has stood since 1910, when he broke the 1906 record of Lee Guinness, which had been 25 seconds.

Erle's performance, which means a speed of 101.5 miles an hour on a 9 per cent grade of 1 kilometer length, was far ahead of the time made by rivals. Chavez, who drove Wagner's grand prix Fiat, made second best time in 26.2 seconds. The other performers were:

Car	Driver	Time
.....	Crespelle	:36
Anasatti	Guyot	:37
Hispano-Suiza	Bara	:37.3
*Bedella	Bonville	:39.3
Alcyon	Barriaux	:41
Bugatti	Pouget	:45.3
Bugatti	Pouget	:53.2

Touring cars which climbed the hill and their drivers were:

Car	Driver	Time
Hispano-Suiza	Derny	:80
Benz	Erle	:43.3
Scap	Mollet	:47
Sunbeam	Rigal	:47.4
Scap	Charles	:48
Motobloc	Delpierre	:50.4
Barre	Ravaud	:52
Scap	Launais	:55.1
Bugatti	Tonello	:58
Panhard-Knight	Artault	:58

FIFTEEN IN CHICAGO RELIABILITY

Chicago, Oct. 8—Fifteen entries are already in for the Chicago Motor Club's sensational reliability run around Lake Michigan, which is scheduled to start October 21, and it is believed that at least half a dozen more will be rounded up. But even the fifteen make a larger field than any other reliability of the year has had outside of sociabilities or club events.

Already in are a Velie, two Stutzes, a Falcar, Detroitier, Case, Chalmers six, two Stavers, two Coey Flyers, two Bergdolls and two Molines, while there are excellent hopes of getting two R. C. H. cars, Marion, Cino, Ohio, Cutting, another Velie, Henderson, the two military Cadillacs, Mason Paige-Detroit and cars equipped with Rayfield and Stromberg carbureters.

PROGRESS OF WHITE PATHFINDER

Leadville, Colo., Oct. 8—Special telegram—The White six pathfinding car which is blazing a route from Denver to Salt Lake City left Denver at 9 o'clock yesterday morning with James A. Harris, of the White company; N. Lazarnick, a New York photographer; Walter Rheinick, the driver, and John P. Dods, of the Automobile Blue Book, who is logging the route. The party reached Jefferson, Colo., in the evening and found the roads remarkably good. The roads compare favorably with any of the mountain roads in the east, and the tourists found it the most wonder-

Benz Breaks Record in Gaillon Contest in France by 1 Second

ful they had ever seen. Most of the roads are fine dirt or gravel with very few rough spots. Some of the grades are as high as 18 per cent, but all the new work that is going in reduces the grades to not more than 5 per cent.

The magnificence of the scenery is beyond description. It begins at Morrison in the Red Rocks park and continues all the way up the rough Bear Creek canyon, with constant climbing a good deal of the way to Conifer, 8,150 feet above sea level, then down to Bailey's and up the South Platte canyon across Kenosha pass at an altitude of 9,980 feet. A good deal of snow was encountered in the road, but there was no trouble in coming down the pass into the wonderful South Park. This is a broad flat valley actually on top of the world and completely surrounded by snow-capped peaks. The night was spent at Jefferson. It was very cold there and everything was frozen in the morning, but it was bright and clear. The party was on the road early and found fine grade practically all the way into Leadville, the night stop. Even with the ground wet with the melting snow chains were not needed. The ride down South Park pass offered constantly changing views of the high snow peaks. Trout Creek pass at an altitude of 9,470 feet and 114 miles from Denver and from there to Buena Vista is almost all down grade through Trout Creek canyon past Castle rocks, with the first real views of the continental divide. The afternoon trip from Buena Vista up the Arkansas valley offered some thrills where the new road has been cut out along the hillside 600 feet above the river. There are miles of this with

good surface but narrow road. At Granite the Twin Lakes road was followed. Twin lakes nestle right at the foot of the highest peaks, mount Elbert on the right, 14,421 feet high, and Twin peaks on the left, nearly as high—a remarkable setting for the beautiful lakes. A snowstorm on the peaks above was seen when the party was in sunshine.

The pathfinder arrived at Leadville, the highest city in North America, at 6 o'clock in the evening and expects to make Tennessee pass and Glenwood Springs without trouble tomorrow.

HILL-CLIMB AT ASHEVILLE

Asheville, N. C., Oct. 3—Under ideal weather conditions, the first sanctioned A. A. A. hill-climb ever held in Asheville was contested today. A crowd of about 4,000 people turned out to see the racers climb the steep French Broad avenue hill, which has a grade of 12 per cent for nearly ½ mile. In spite of the fact that the officials and drivers were to some extent handicapped by inexperience, the climb was a good one and some good time was made. Owing to withdrawal of entries, only five of the eight scheduled events were run. The climb today is only an experiment leading up to a great hill-climb which it is proposed to hold here next year. The winners in the various classes today were as follows:

Car	Driver	Time
Flanders 20	Frank Mears	:55%
Flanders 20	Frank Mears	1:10%
161-230 cubic inches piston displacement:		
Ford	W. R. Bolter	:52%
E. M. F. 30	Frank Mears	:56%
301-450 cubic inches piston displacement:		
Buick	Neil Plemmons	:49%
Nyberg	A. G. Dale	:56%
Free-for-all:		
Nyberg	A. G. Dale	:53%
Ford	W. R. Bolter	:54%
Cars \$1,600 and under:		
Flanders 20	Frank Mears	:56%
Chalmers	G. E. Henderson	:64%



ALCO TRANSCONTINENTAL TRUCK AND ESCORT ENTERING PETALUMA, CAL.

Knox Reports Outlook Encouraging

SPRINGFIELD, Mass., Oct. 5—The outlook for the Knox Automobile Co., of this city, which made an assignment to Edward O. Sutton and Harry G. Fisk last week for the benefit of its creditors, looks much more hopeful now than it did a few days ago. Edward O. Sutton today made an emphatic denial of the rumor that 130 men had been discharged and that the payroll had been cut down one-half. He stated that the company had started along the lines of intrenchment, and so it had been necessary to lay off eighty-five employees.

According to Mr. Sutton, who is the superintendent and general manager, and therefore knows the real facts, the number laid off represented but 20 per cent of the force instead of 50 as alleged. He was not prepared to say what further reductions might be made, for it all depends upon business conditions.

Mr. Sutton stated that the prospects are more encouraging than could have been expected for the continuation of the business. He pointed out that at the time of the assignment there were orders on the books for seventy-one vehicles, and since that time eight more were received, two of which reached the company yesterday. To fill these orders it will be necessary to operate the factory for at least 4 months, and as the indications are that the business will be coming in as usual no necessity for a shutdown is expected.

Plans for the reorganization of the company have not been completed yet, but they are under way. It is the wish of the officials to continue operation until capital can be interested. The support of the board of trade will be solicited to aid in the reestablishment of the company on a sound basis, and this will be of much help. Mr. Sutton stated that by figuring in the real estate owned by the company the

Enough Orders for Cars on Hand to Operate Factory 4 Months or More

assets would amount to more than the liabilities and that this would be of much value in bringing about a plan for continued operation. He added, however, that the officials would be willing to sell outright if a fair price could be secured.

POPE HAS GOOD YEAR

Hartford, Conn., Oct. 5—The annual report of the Pope Mfg. Co. for the year ending July 31 has been issued to the stockholders. It shows that the company has enjoyed net earnings during the past year amounting to \$251,290 on a gross business of \$3,734,112. According to President Pope's report the assets of the company consist of the following items:

Real estate, patents, good will, etc.	\$5,781,293
Construction	36,276
Additions, adjustments and installation	243,681
Cash items prepaid	534,177
Inventories	1,477,312
Good accounts	396,608
Cash and cash items	253,289
Total	\$8,723,176
Less deductions for reserves, replacements, etc.	440,998
	\$8,282,178

The liabilities are as follows:

Capital stock issued	\$5,989,000
Two-year 6 per cent gold bonds	1,000,000
Accounts payable, payrolls, deposits, etc.	260,098
Contingent liability	20,159
Surplus, 1911	936,430
Net earnings, 1912	251,293
Total	\$8,457,070
Less dividends	174,892
	\$8,282,178

The surplus of the company stands over \$1,000,000 after writing off \$440,000 for reserves and for future replacements, scrapping of machinery and deterioration. No doubtful accounts are included in the statement. The company paid 6 per cent

on its preferred stock and made one payment of 1 per cent on the common.

President Pope says that the plants have been kept in the most efficient condition and the cost of up-keep charged to operations. The inventory was made at actual cost and the item of accounts payable covers invoices that had not matured on July 31. All bills have been discounted.

Speaking of the new medium-priced model he says that the augmentation of the line of product has made additional factory space necessary. The new building, which will have 70,000 square feet of floor space, was nearing completion at Hartford at the time of the report. The truck has met with success, according to the report, and a 5-ton model will be added to the present output of 3-ton wagons. The motor cycle business has been good.

When the report was mailed October 1 the company reported all the orders for pleasure cars that can be manufactured during the coming year and substantial orders for trucks.

ALCO CREW GIVEN BANQUET

New York, Oct. 8—Members of the crew which piloted the transcontinental Alco truck from Philadelphia to Petaluma, Cal., were honored at a dinner given last night by the American Locomotive Co. After a speech of welcome by Harry S. Houpt, general sales manager, and a brief address by Charles W. Young, head of the concern that owns the truck, there were talks by E. L. Ferguson, the veteran pilot, who was captain of the expedition, Frank Morin and Walter Dick, drivers, and John Cambon, assistant.

Predictions were made that interurban motor truck deliveries will be more common than ever before, and that the trip of the truck over bad roads and weak bridges will have the effect of stirring associations toward making improvements in all sections of the country. It was announced that the truck made its 4,145-mile journey in 409 hours of actual running time, which, reduced to operation without stops, amounts to 34 days of 12 hours each.

ANOTHER ATLAS ATTACHMENT

Springfield, Mass., Oct. 5—The Atlas Motor Car Co., of Springfield, Mass., which was forced to suspend operations some weeks ago because of the failure of the Atlas Motor Car Co. in the west, preventing the former company from securing motors, has been attached again. Three suits were filed against the company during the week. The Hampden Brass Co., of Springfield, Mass., filed an action for \$1,500; the R. E. Dietz Co., of New York, one for \$200, and the Firestone Tire and Rubber Co., Akron, O., one for \$200 also.



SAN FRANCISCO POLICE ESCORT COAST TO COAST ALCO INTO CITY



Uncle Sam's Grip on Europe

By W. F. Bradley

bicycle and had to bear down a lot of criticism against its high-clearance and ungainly lines. They are what is known as the stock objections, and the very mention of an American car will even now bring them forth, before the car is introduced. They are high clearance, unsuitable lines, ungraceful bodies, poor workmanship, and lack of finish. Although American methods have altered considerably during the last half dozen years, the objections remain and with them the bad impression of the methods of some of the earlier dumpers.

America's Hold on Market

But America has now got a hold on the French market and has its recognized place in Paris motor row. In the car section of the business Ford has secured the premier position, and indeed to the average Frenchman Ford personifies the American industry. Ford made his first serious at-

tempt to secure a position on the European market in 1908, the cars being shown at the Paris salon of that year and an energetic business campaign opened. The cars had been sold on the European market, however, before that date. Ford had to take the full brunt of the stock objections, rendered the more serious because those on appearance and clearance were unanswerable.

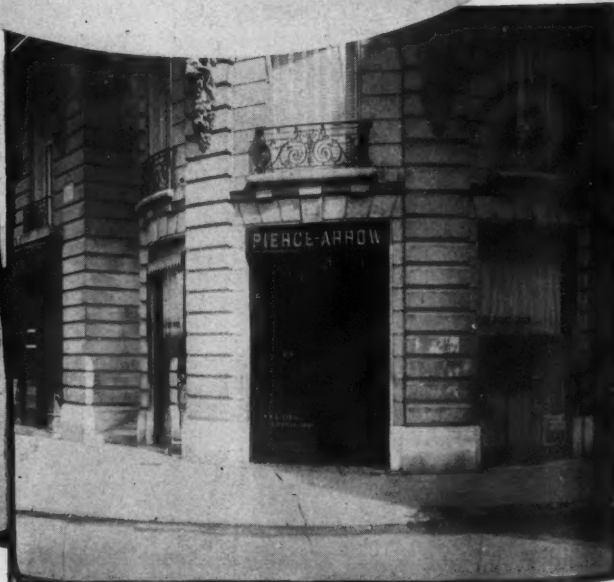
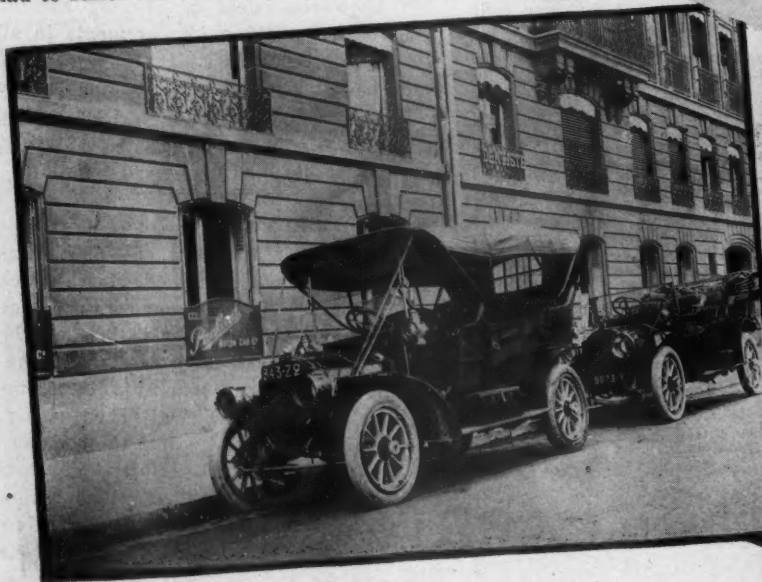
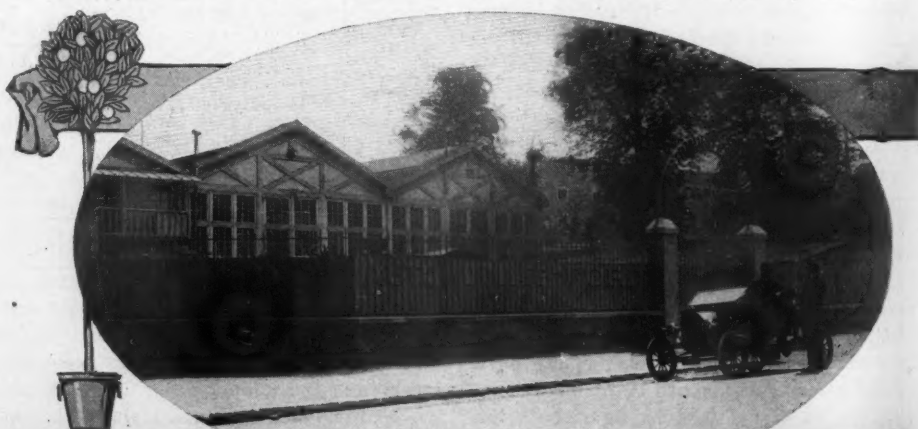
Ford's European Business

The reply to them was effective, if not direct—low price; and when, after demonstration on demonstration, it was proved that the low price included reasonably good wearing qualities, the car made headway. As an indication of the important position secured by Ford on the European market, the following list is of interest. The figures show the number of cars sold in the various European countries for the 12 months ending September 30, 1912. England, although the best customer, is not included, the conditions there being entirely different from those on the continent. Although given out by the Ford company, the figures appear to be accurate; indeed, those for France, which the

PARIS, Oct. 1—Paris may be considered both the headquarters and the stronghold of continental Europe's motor industry. It is the birthplace of the motor car; the greatest manufacturing center in the old world; it has the protection of national pride and of customs duties. With such a combination of factors in its favor, it is hardly to be expected that the American car will figure prominently in the French capital. As a general rule French manufacturers are only beginning to realize that the American product is a vital factor by the reports and complaints coming to them from the British representatives. At home they are not alarmed at, or seriously interested in, an American invasion.

Early Cars Ridiculed

Yet, with their natural tenacity, American manufacturers have been endeavoring to secure a footing on the French market for the last 7 or 8 years. With rare exceptions they were laughed out of the field; among those exceptions was the little Oldsmobile, which had a brief period of success and still has a few of its tiller-steering models doing service in districts where fashion does not hold sway. In addition to a natural prejudice against any foreign-built car, the American machine had to suffer for the sins of the American



PARIS BRANCHES OF FORD, PACKARD AND PIERCE-ARROW

American Cars Growing in Popularity

writer has had opportunities of verifying, may be taken as entirely correct.

France	462	Holland	28
Russia	294	Switzerland	27
Germany	207	Denmark	22
Spain	126	Norway	16
Belgium	79	Turkey	15
Italy	69	Portugal	9
Austria-Hungary	54	Egypt	5
Sweden	66	Servia	4
Bulgaria	41		
Roumania	42	Total	1,566

Up to the present the Ford business has been conducted through a general selling agent for the whole of France and a central office in Paris for the control and development of the business in the various European countries. England has always had its own organization. At an early date, however, the European business will be a branch of the American concern, the general selling agent being abolished. Whether an agency is established or a European branch formed, it has been amply proved that anything approaching dumping is doomed to failure in Europe. **Service a Necessity**

French motorists practically live at the doors of the home factory and have acquired the habit of letting the factory know at once if the car is not giving good

service or they are not being satisfactorily treated. Americans must at least equal the home firms in this respect, maintaining a necessary stock of spares ready for shipment at any moment and expert mechanics capable of removing the real or imaginary defects in the running of the cars.

To place any American car on the French market the selling price necessarily must be increased 22 to 25 per cent. This represents freight charges and duty at the rate of \$22.50 per 100 kilos. But in order to induce agents to handle an unknown foreign car it often is necessary to offer much higher commissions than for any European car, with the result that some American cars are offered for sale in Paris at an increase of more than 50 per cent over the retail New York or factory price.

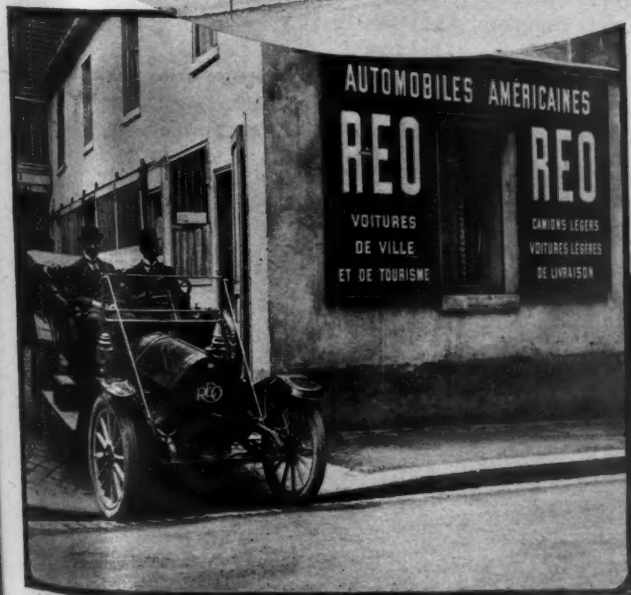
One American car sold in New York at \$725 is listed in Paris at \$1,100; another listed at home at \$950 is sold here at \$1,500; a third costs \$1,150 in America and \$1,850 in France; a fourth \$1,750 at home and \$2,400 abroad. Naturally the

percentage of increase may vary considerably, for the manufacturer may make sacrifices to meet the foreign market; but the freight charges and customs charges are invariable and must of necessity add to the cost from 22 to 25 per cent.

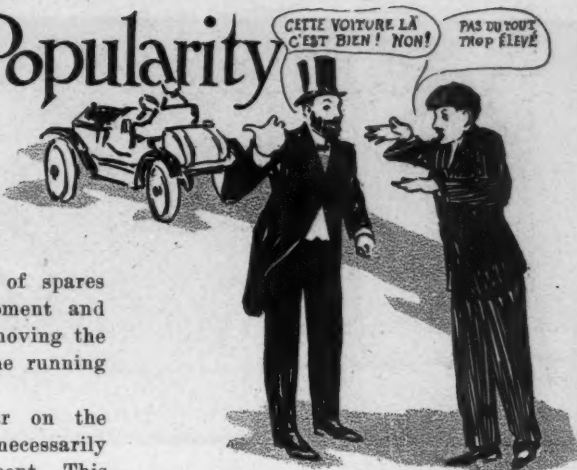
After Ford, Mitchell undoubtedly is the oldest established of the American firms in Paris. The firm is the European branch of the Mitchell-Lewis Motor company, and not merely an agency. In this case a direct bid is made for the medium class of trade, the class which is most highly developed by the European factories, and in which competition is naturally keenest. Even in this class the American car has a slight advantage in the matter of price, obtained very largely by the economies made in body building and general equipment.

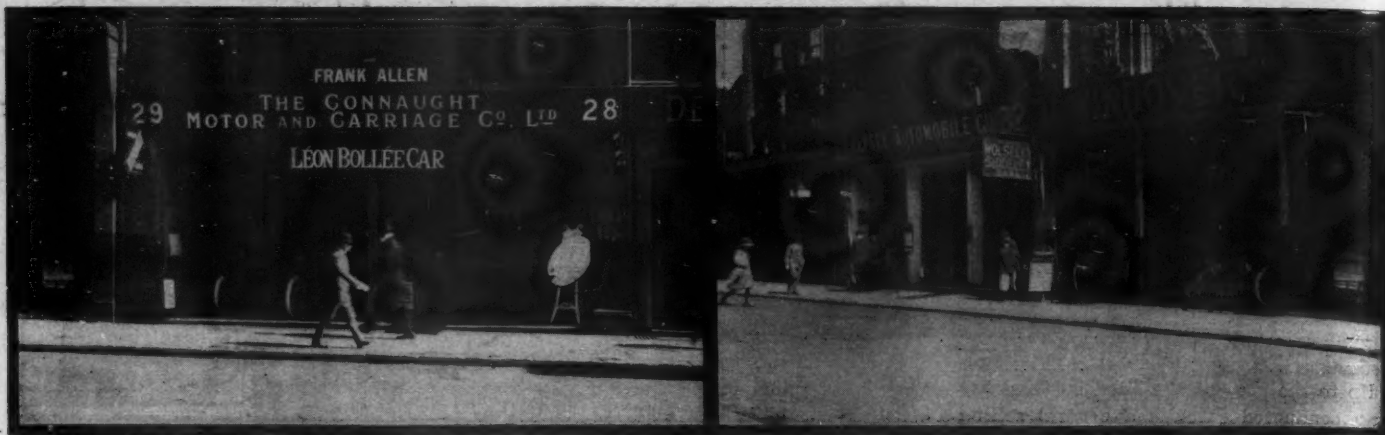
One American Advantage

The difference in price between the American chassis and the completely equipped American car is so slight that no European body maker could produce a body at the figure. It is in this particular feature that the American has one of his most important advantages over the European. Car makers have devoted themselves to chassis production so exclusively that, to take but one example, the



PARIS BRANCHES OF STUDEBAKER, REO AND MITCHELL





REPRESENTATIVE MOTOR CAR SALESROOMS IN LONDON

Renault works, the largest in Europe, does not produce a score of completely equipped cars a year. Individual owners have asked for their own peculiarities to be worked into the body, and manufacturers have given way to them to the detriment of standardization. During the past year several of the American manufacturers of medium-priced cars have come on the French market. These are Reo, Buick, Hupmobile, Studebaker and Overland. In all cases the business is managed by agents who have not been established a sufficient length of time to allow an estimate to be formed on their ultimate degree of success.

Packard Touring Bureau

American high-grade cars are represented in Paris in quite a different manner. Nearly half a dozen years ago the Packard Motor Car Co. opened a touring depot in Paris for the convenience of its clients touring Europe. The object was to supply spares and give all possible touring information and assistance to Packard owners. The office, which is now in charge of R. N. Goode, has grown enormously in importance. It is declared that 400 Packard owners have personally reported to the Paris office, or have been reported by the home dealers, during the past 12 months.

Despite every endeavor to keep in touch with all Packard tourists in Europe, a certain number must come in and return home without either the Paris office or the home agent being aware of their visit to the old world; thus the record on the company's books is necessarily slightly below the total number of cars having entered Europe. The Packard depot comprises a touring bureau, supplying free all information on routes, customs, etc.; a spare parts department with such an assortment that any required part can be shipped within an hour of the receipt of a telegram; and a well-equipped repair shop.

During the present year the scope of the depot has been extended by the opening of a rental department. This undoubtedly has been a very wise move on the part of the company. Not only are the cars kept in constant service—for the touring season is no longer confined to the months

of July, August and September—making the venture a financial success, but their presence in Europe makes it possible to get into touch with prospective clients most difficult to reach at home. After an ideal tour of several thousand miles through Europe the impression of the hirer is such that it should not be difficult for the home salesman to do business. A small number of sales have been effected in France, but these have been limited more by the inability of the factory to make deliveries than by the failure of the Paris manager to find business.

After Packard, the Pierce-Arrow Motor Car Co. opened a Paris depot with headquarters in the Avenue de la Grande-Armée. Manager Goodsill reports 175 Pierce cars on his books for the year ending September, 1912, this necessarily being below the total number in Europe, owing to the failure of many owners to report to the depot. The office supplies touring information, spares, undertakes repairs and generally looks after the interests of Pierce owners touring Europe. In view of the large number of applications for Pierce cars to hire for long or short distance touring in France, it is the intention to establish a rental department early next year. The only other firm maintaining a Paris depot is the Peerless company, which, while not running its own branch, has an agreement with the New York garage, in the Rue du Mont Thabor, to maintain a full stock of parts for Peerless owners.

Checking Tourists

Taking the figures given by the Packard and Pierce companies, adding to them 125 cars of all other makes, the total is 700 American high-grade cars touring in Europe during the present year. Four thousand dollars probably is a low average value for these cars, for in nearly every case they are the latest models with elaborate fittings. Even on this basis the total value of the cars is \$2,800,000.

The French method of checking imports and exports is to give in the returns the value of all cars, whether brought into the country for permanent or temporary use, and to include those cars with the French experts when they leave the country. This

makes the French returns, so far as America is concerned, of very little value. It is necessary only to compare the French exports with Switzerland's, which has a very low native purchasing power, with those to some other countries having no attraction for the tourist, to realize the misleading nature of these returns. The American export returns do not appear to be any more satisfactory, for in the \$449,737 worth of cars sent into France during the last financial year must be included the value of that portion of the 700 tourists having disembarked their cars at a French port. English returns are much better in this respect, for they differentiate between permanent imports and cars brought into the country for re-exportation.

American Accessories Sell

The interest of the American accessory trade in the French market is mostly indirect. All the leading machine tool makers maintain their own establishment; the tire business has been represented for several years by the Goodrich company, which now has its own factory in the suburbs of Paris and controls a big slice of the French business; but the ordinary accessory manufacturer is represented by French agents. The only exceptions appear to be the Rushmore Lamp Co. and the Edison Battery Co., which have branch houses.

All American accessories adaptable to the needs of the European market find a ready sale in France, despite the duty imposed on them. American tools, in particular, have met with success. There appear to be possibilities of considerably increased business in American accessories on the French market; agents willing to take up the sale of these articles generally complain of the difficulties they have of getting in touch with the manufacturers.

An examination of the European situation shows that it is not worth while for any American manufacturer to confine himself to any one European country. England is distinctive, forming a market which can be treated independently of all others. A central office should be established—and France is well situated for this purpose—for the control of the whole of the business in continental Europe. Such

an office should be a branch of the home concern, appointing and controlling its agents in just the same way as the factory controls its business in the various states of North America. The apparently simpler method of appointing an agent and leaving him to work out his own and the car's salvation or damnation has more often resulted in the latter than the former. There is an advantage in dealing with the countries of continental Europe as so many united states which is not obtained at home. Bad business in any one European country does not necessarily affect the others. Bad crops in Russia, for instance, do not entail poor motor car business in Germany. The present war between Turkey and Italy does not interfere with the business in Roumania. Even the combination of a slump, no show, and no races, in France—as occurred a few years ago, had no serious influence on the amount of business in other European countries.

FRENCH FIGURE CAR DEPRECIATION

Paris, Sept. 18—Motor car depreciation has been discussed by the members of the technical committee of the Automobile Club of France and five different methods of determining this depreciation have been classified. They are as follows:

French taxicab companies' method of writing off the complete value of the chassis in a period of 10 years.

The minister of war, in dealing with cars called up for army service, allows a depreciation of 33 per cent on the total value for the second, third and fourth years of service, and of 66 per cent for the following up to the tenth year of service.

M. Max Richard, of the technical committee, writes off the value in 7 years, as follows: 25, 20, 15, 10, 10, 10, 10 per cent.

M. Perissé, vice-president of the technical committee, writes off 20 per cent as soon as the car is put into service; 10 per cent of the reduced figure at the end of the first year; then 25 per cent of the non-depreciated value at the end of the following years.

M. Leroux, another member of the committee, favors the following method: 20 per cent as soon as the car goes into serv-

ice; 15 per cent at the end of the second year; 10 per cent for 4 years; 5 per cent during the 4 following years; the final value of the chassis is about 5 per cent of the cost price.

Bodywork is depreciated one-third as soon as put into service; at the end of the second and the 3 following years one-sixth and is considered of no commercial value after 5 years' service.

GERMANY'S CAR COUNT

Berlin, Sept. 29—According to official returns, the total number of motor vehicles of all kinds in use in Germany on January 1, 1912, was 70,006. These comprised 43,162 pleasure cars, 6,687 motor trucks, 20,000 motor bicycles, and 157 motor-driven tricars for business purposes. The figures show an increase of about 21 per cent in the number of motor-cars and a substantial decrease in the number of motor cycles. In the official returns it is stated that 37 per cent of the total number of vehicles are used entirely for pleasure purposes; 36.3 per cent are commercial vehicle; 11.2 per cent belong to doctors or other professional persons; and 15.2 per cent are motor buses or vehicles employed in the hiring business. The returns for the last 6 years to January 1 each year are as follows:

Date.	Motor-cycles.	Motor cars.	Tri-cars.	Motor trucks.	Total.
1907	15,700	10,115	254	957	27,026
1908	19,573	14,671	235	1,543	36,022
1909	20,928	18,547	248	2,004	41,727
1910	22,283	24,639	196	2,823	49,941
1911	20,584	32,894	121	4,206	57,805
1912	20,000	43,162	157	6,687	70,006

FRENCH HOLD BRAKE TESTS

Paris, Sept. 18—Official brake tests have been carried out by the technical committee of the Automobile Club of France, with a view to determining the distance and length of time necessary to stop a car traveling at a given speed. A straight stretch of road was marked with a number of posts placed at intervals of 100 meters, and carrying, respectively, the figures 1, 2, 3, 4, 5. The cars were given a run of 150 to 200 meters from the first post, an observer on board taking the time for this run.

As soon as the speed of the car had been determined, the observer gave the signal

to stop by means of a bell, and at the same time allowed a bag of sand to drop to the ground. When the car was stopped, its distance from the bag of sand was measured, and the time of stoppage also was taken. The tests were carried out with two cars, one weighing 2,292 pounds empty and the other 3,086 pounds. The road surface was good macadam, slightly damp at the time of the trials. The results were as follows:

Type of car	No. of passengers	Total weight, pounds	Miles per hour at moment of braking	Length of time brakes applied, seconds	Distance covered under test, feet
Car A, 1 steel non-skid at rear	4	2,843	13.15	5%	75
Car B, smooth tires on all wheels	4	3,037	20.9	5%	68.8
"	3	3,527	21.6	3%	76.4
"	3	3,527	21.7	3%	61.8
"	3	3,527	27.6	4%	125.9

It is intended to continue the tests at a later date, making use of a large number of cars of very varied types.

SOUTH AMERICA IMPORTS TAXIS

New Orleans, La., Sept. 9—Taxicabs form a large percentage of the motor cars which are exported to Latin America through this port. With the increasing amount of smooth-surfaced streets in that section of the world, taxicabs are taking the place of the time-honored coach. In all Latin American cities the public coach service is an institution that was inaugurated shortly after the coming of the Spaniards and has flourished despite the advent of street cars and motor cars.

Coach fares are very cheap, being regulated by the municipal governments. The best coaches, really elegant equipages, are hired for 50 cents per hour, but the medium class, which is more generally used can be had for 37 cents an hour. This low rate has made it necessary to quote almost as low rates for taxicabs and as there is little variation in the coach rates throughout Latin America, it will be found that taxicabs usually may be had at a slightly higher rate than is charged for the first class coaches.



TYPICAL RETAIL SALESROOMS SUCH AS ARE FOUND IN EUROPE



Routes *and*

Motorists at Door of Yosemite Valley

By Paul Gyllstrom

SANTA BARBARA, Cal.—Editor Motor Age—After having been excluded for several years, the motor car is at the portals to the wonderful Yosemite valley, and the prospects are considered excellent that the demand for admittance will be granted. It will not come immediately but it is evident to any one who has studied the situation that it is only a matter of time when regulations will be so altered as to bring about a radical change in the Yosemite.

All interested in the present horse-drawn stages are opposed to the plan of admitting motor cars and the most radical are the picturesque stage drivers. But it is believed in certain quarters that the persons interested in the staging as an investment realize the trend of things, and in all probability they will prepare to meet any changes.

When the change comes it will be a radical one. Not only will the motor car be admitted to the valley, but because of the very nature of things the horse will have to be withdrawn and staging into the valley from Wawona, El Portal and Chinese camp will have to be by motor. The two can not be permitted to traverse these roads at the same time. It would be too dangerous. It must be remembered there are several hundred horses engaged in various work, including staging, that never have seen a motor car. In a city horses may be gradually broken to the car, but that can hardly be done on a stage road, where one frightened animal would cause a

tragedy. There are very few sections of the roads leading into the valley that do not skirt dangerous places. The present antipathy to the car on the part of the stage drivers is so great that one probably would not hesitate to shoot down the driver of a car that dared pass the border line. And in view of the great danger to passengers, at present he would be warranted in taking drastic action, some think.

The sensible system in opening the doors to the motor car would appear to be to set

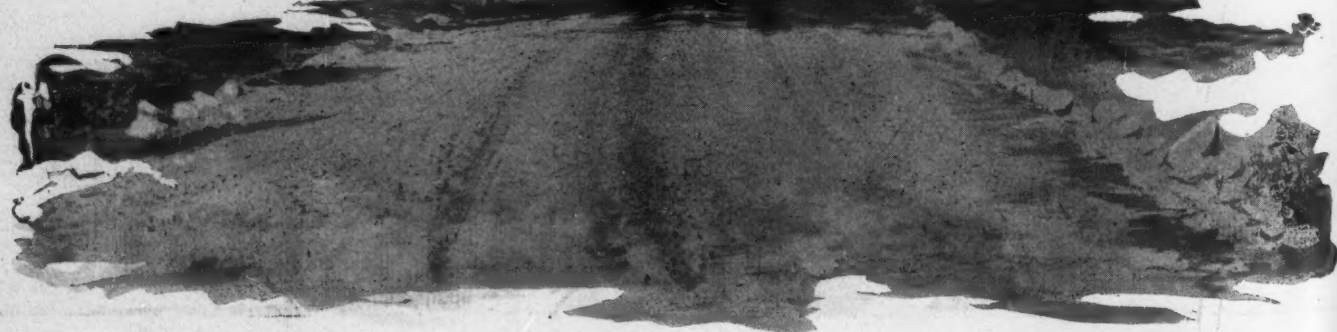
a certain date when they would be admitted. That day should be so far ahead that the staging companies could have sufficient time in which to dispose of their stock and provide for staging by motor. Having barns at terminals the companies consequently have good locations for garages.

Also, before motor cars can be admitted, the government will have to expend a considerable sum on the improvement of the approaches to the valley. In many places they will have to be widened and provisions made for passing places. That probably would not be a serious situation

under present conditions, as there are many mountain passes in the west traversed by motor cars that are in poorer condition than the roads leading to the Yosemite. But the rush into the valley during the summer months would be so great that it would seem wise to take every precaution against accidents.

Motor cars were allowed into the valley while the park was under the jurisdiction of the state of California. But the state turned the park over to the government when motor-ing still was in its infancy and the staging traffic had not grown to its present proportions. But the government immediately barred the car.

Outside of the staging interests the car is favored. Persons who have concessions in the valley realize business will be increased. Tourists, who have made the trip in once, would be glad to know that on a second trip they could be rushed from the edge of the



THIS ROAD LOOKING TOWARDS CATHEDRAL ROCKS HAS BEEN PARTLY IMPROVED BY THE GOVERNMENT

Touring Information

Growing Demand for Car Admission



park to this extraordinary playground expeditiously and without the present dust annoyance.

From El Portal to Camp Curry, at the eastern end of the floor of the valley, is a climb of nearly 2,000 feet in a distance of 16 miles. The stages cover the distance nearly to the minute on the established schedule of 4 hours. The first stage leaves El Portal at 7 o'clock in the morning. The government sprinkles the road, but the workmen do not come out with the peep of dawn and very few stations have been wetted down when this stage passes over the road. The result is that the horses kick up such a dust that the passengers are enwrapped in it pretty much, according to the whims of the breeze. It is true dust-ers are provided, but that only helps some.

A large passenger-carrying motor car could easily cover this distance in safety in an hour and a half. In fact most of the 8-mile stretch within the valley, which is 4,000 feet above sea level, could be whisked over very rapidly, but as cars would be very common it would be wise to establish low speed regulations.

El Portal road would be the easiest for the motor to travel, and this point is now reached from the outside without shipping the car. Cars also run to Wawona and Chinese camp, each about 20 miles from the valley. But both roads are simply widened trails that have to make the descent into the valley. That from Wawona is by way of Inspiration point, which is 1,500 feet above the floor, thence 3 miles to the floor.

The advent of the motor would not mean the withdrawal of all horses from the valley. Pack horses and mules would continue to be a necessity for trail work. The climbs from the floor to the edge of the valley is so great that only the hardier attempt them by foot.

Glacier Point is one of the vantage view points at the rim of the valley. This is a sheer rise just above Camp Curry. But it can best be reached by an 11-mile trail that leads by Vernal and Nevada Falls and other scenic spots. The admittance of the motor car probably would

create a greater demand for trail animals because of the increase in business, a fact which does not appear to be appreciated by the staging interest that oppose the car. There is now a close relationship between the different concerns engaged in this business.

There are now about 400 animals engaged on the traffic that concerns the Yosemite valley. About 200 are used on the stages, while the others are used for rigs to take visitors about on the floor; and on the trails. The number used on the trails are, however, greatly in the minority at present, burros being largely used.

One reason the tourist will favor the motor car, will be because of the reduced cost. The rate varies from \$2 to \$7.50 each way. The company charges \$15 from the valley to Wawona and then back to El Portal, a total distance of about 50 miles.

There are about 20 miles of roads on the floor of the valley, which is as level as a prairie. There is a road leading down on each side of the valley, a total of 16 miles. The valley is about a mile wide and there are a few cross roads and laterals. The roads at the entrances to the valley, past Bridal Veil Falls on the south and El Capitan and Yosemite Falls on the north, are in fair condition up to the village which is in about the center of the valley. Beyond the village the roads are very dusty and never sprinkled.

Although the sprinkling is in charge of the government, it appears a bit odd that this



YOSEMITE PARK SHOWING THE NORTH DOME, WHICH IS 3,725 FEET ABOVE THE VALLEY

is not more general. A start has been made by the government to improve the roads and the foundation was laid for a mile stretch when something went wrong with the stone crusher and the work has lagged several months.

The best kind of road material is right at hand, as the entire formation is granite. Some is of the disintegrating sort, but there are vast quantities of rock hard as flint.

One of the earnest advocates of opening the valley to motor car is Samuel Hill, of Seattle. Mr. Hill, who is a son-in-law of James J. Hill, the railway magnate, recently visited the valley. He ran his car to Chinese camp and from there took the stage. Upon returning to San Francisco, he commented upon the wonders of the valley and at the same time deplored

Road Directions for Motor Age Readers

MOTORING TO ALABAMA

BROOKVILLE, PA.—Editor Motor Age—Kindly inform me of the best route from here to Birmingham, Ala., by way of Cincinnati, O. How much mileage should a 30-horsepower E-M-F roadster get on 1 gallon of gasoline?—Fred Knapp.

First go to Reynoldsville, Rathmel and Luthersburg, 15 miles, then to Pittsburgh 103 miles through hilly country and over some rough roads, but still the best. The towns are Big Run, Punxsutawney, Trade City, Smicksburg, Rural Valley, Kittanning, Slatelick, Freeport, Tarentum, Springdale, Red Raven, Aspinwall, and Pittsburgh.

It is 190 miles to Columbus, O., through Carnegie, Bridgeville, Canonsburg, Washington, Pa., and the National highway passing Claysville, Elm Grove, Wheeling, Bridgeport, St. Clairsville, Loydsville, Morristown, Hendricksburg, Fairview, Elizabethtown, Washington, Cambridge, New Concord, Norwich, Zanesville, Mt. Sterling, Gratiot, Linnville, Jacktown, Kirksville, Etna, and Reynoldsville.

There is a good road through Chadville,

Springs, Warrior, Kimberly, Morris, Gardendale, Louisburg, Artesia Springs and Birmingham.

By following out the itinerary given to an inquirer from Milwaukee, Wis., last week, you will have the balance of your routing to Birmingham.

One gallon of gasoline is supposed to give something like 18 miles.

SAGINAW, MICH.-NEW ORLEANS.

Saginaw, Mich.—Editor Motor Age—What is the best route to New Orleans, La., also condition of roads in general.—R. M. McAvoy.

Saginaw to Detroit is 93 miles and a good road of macadam or gravel through Bridgeport, Pine Run, Mt. Morris, Flint, Waterford, Pontiac, and Birmingham. The itinerary for the National tour this year can be followed out for the most part, although for better roads a few changes are advisable. The objectionable piece of road is in Kentucky and although only a short distance



VIEW FROM ARTIST'S POINT, WITH EL CAPITAN TO THE LEFT

the fact that motor cars were excluded. But he also observed that the government would soon have to heed the general demand.

It was officially stated that about 10,000 persons visited the Yosemite valley last year, with the prospects of the number being a little smaller this year. Last year was probably the banner one in the history of the valley, having gradually increased the last 10 years. Using these figures as a basis it is safe to say that since the advent of the white man to the region not more than one quarter of a million persons have been in the Yosemite valley.

Bloomfield, Circleville, Williamsport, Washington Court House, Sabina, Wilmington, Clarksville, Morrow, Foster's crossing, Montgomery, Silverton, and Cincinnati. This is a distance of 124 miles.

It is an enjoyable 119 miles to Cincinnati through Hawthorne, New Palestine, Fountaintown, Gwynneville, Arlington, Rushville, Connersville, Evartown, Blooming Grove, Brookville, Cedar Grove, New Trenton, Harrison, Miamitown, Cheviot, Westwood and Cincinnati. Another beautiful stretch, particularly so in the fall, is to Louisville, 135 miles, by way of Cleves, Elizabethtown, Lawrenceburg, Aurora, Rising Sun, Oberdeen, Markland, Vevay, Carrollton, New Castle, Shelbyville, Simpsonville, Middletown, St. Matthews, and Louisville.

The answer to the Saginaw, Mich., inquiry will serve you to Columbia, Tenn., from which point you route directly south to Birmingham, Ala., 177 miles, through Pulaski, Elkmont, Blowing Springs Hollow, Athens, ferry to Decatur, thence on to New Decatur, Flint, Hartsells, Falkville, Lacon, Cullman, Hanceville, Garden City, Bangor, Blount

from Buffalo to Nashville, Tenn., it is terrific and conditions range from deep sand to large boulders and cobblestones between Magnolia and Green river. There is another road that can be taken through Kentucky and is reached through Paducah, Ky., and is all natural dirt roads, some fording has to be done and ferries resorted to. In wet weather it is all slippery clay soil and quite impossible going in several places.

About the best thing to do is to send the car by rail from Cave City to Nashville, Tenn., and not risk the price of a new set of tires or a spoiled disposition.

To finish the first day's run you will travel through Dearborn, Wayne, Ypsilanti, Saline, Clinton, Tecumseh, Adrian, Madison, Jasper, Lyons, Winameg, Wauseon, Archbold, Stryker and Bryan, making the mileage 215 miles. This would necessitate an early start and no time allowed for sight-seeing in Detroit.

Next in order is Hicksville, Maysville, Fort Wayne, Bluffton, Petroleum, Pennville, Redkey, Fairview, Albany, Muncie, Anderson, Pendleton, Greenfield, Indianapolis, and this leg is 185 miles.

Who Have Asked Route Information

Traveling over the best roads, Louisville is reached through Southport, Greenwood, Franklin, Amity, Taylorville, Columbus, Walesboro, Waynesville, Jonesboro, Seymour, Brownstown, Vallonia, Kossuth, Salem, Pekin, Borden, Bennettsville, Smith, New Albany, and long toll bridge over the Ohio river in Louisville. This stretch is only 134 miles and can be taken leisurely, with plenty of time to stop for beauty spots.

The Blue Book car has just returned from a trip through this country with up-to-date road reports, and Buffalo, Ky., can be easily made through Mount Washington, Bardstown, and New Haven, 69 miles.

Nashville, Tenn., to Tusculum, Ala., is 122 miles and the towns are Brentwood, Spring Hill, Neapolis, Columbia, Ridley, Mt. Pleasant, Sandy Hook, Williamsville, Crestview, Summertown, Lawrenceburg, Dunn, Pleasant Point, Loretto, Green Hill, Ala., St. Florian, Florence, and Sheffield, with something like 10 tolls to pay.

After you leave the Indiana state line you will not find many stretches of fast road for any great distance. There will be a stretch of poor dirt, then very good, and so on, but the scenery always attractive.

EASTERN ROAD REPORTS

The Blue Book Car for the Touring Club of America has been surveying the roads in Western Maryland, to Baltimore, Washington and in Virginia, and their latest reports indicate that there will be no difficulty in traveling to Washington this fall over the routes as shown in the Blue Book.

Some changes were made necessary by road improvement and several new routes were charted to connect up with the trunk lines, lessening the mileage between New York and Baltimore.

The road from New York to Trenton is in good condition. At the Jersey State capital tourists should take Blue Book Route 164

afford the best roads to the national capital for another year.

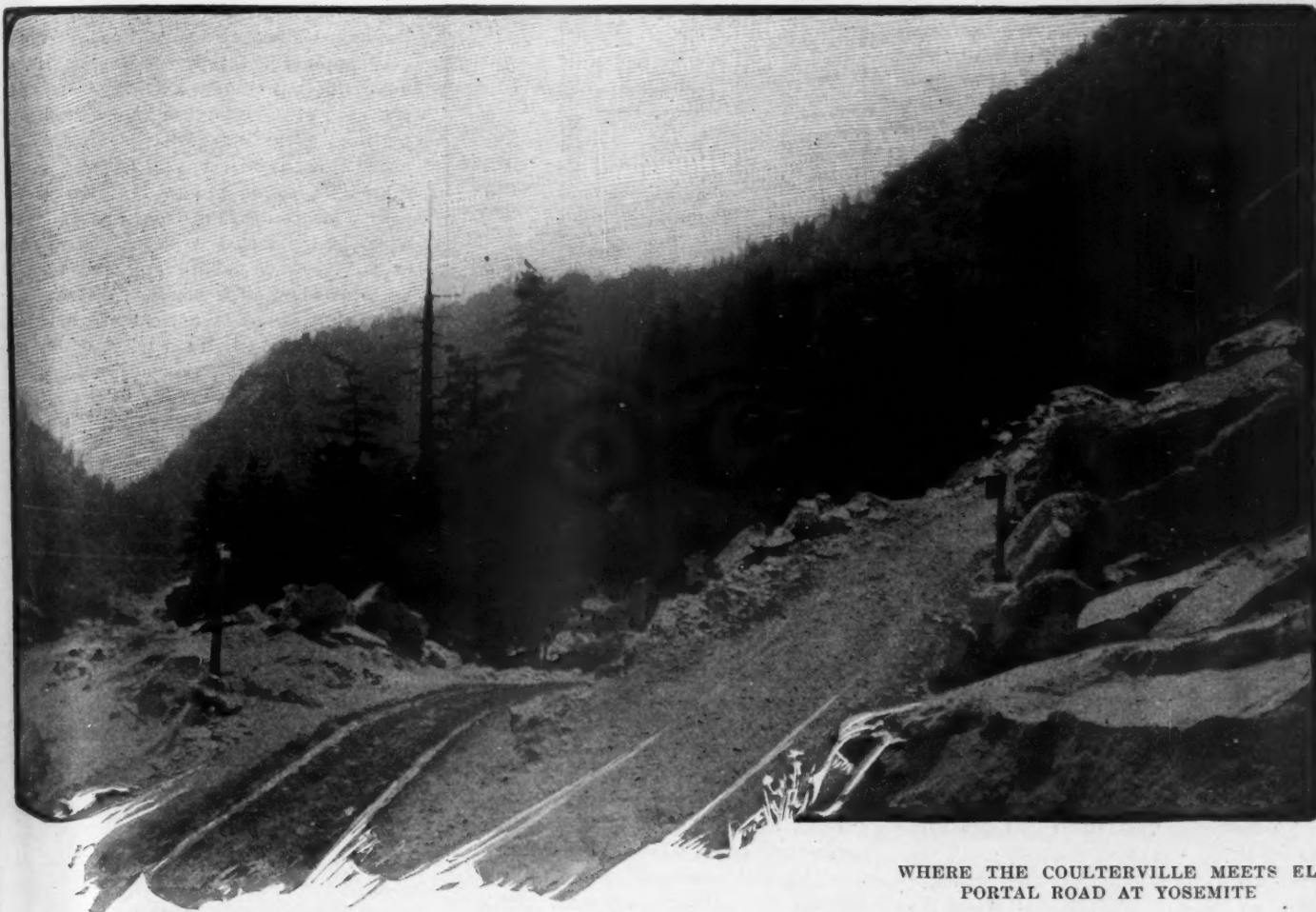
Between Baltimore and Annapolis the scouts advise that the best exit from Baltimore is through Wilkes avenue, out Charles street; after crossing the Light street bridge there is a good macadam road all the way to Annapolis. At this point a boat may be taken for Clayborn and the eastern shore, where is a popular rendezvous for local motorists on account of the good accommodations there.

A new route was laid out between Lancaster and Conowingo, which makes a connecting link for tourists en route to Baltimore and Washington from the north via Harrisburg or Reading. This is a good dirt road, with stretches of macadam covering a distance of about thirty-one miles. This route is recommended in preference to the York-Baltimore pike, which is reported in poor condition.

GOING NORTH FROM MEMPHIS

Martinsville, Ill.—Editor Motor Age—Please outline the best route and give mileage for a motor car trip from Memphis, Tenn., to Martinsville.—L. Wells.

About the best road offered you is into



WHERE THE COULTERVILLE MEETS EL PORTAL ROAD AT YOSEMITE

Going west to Memphis, 160 miles, the routing to Barton, Cherokee, Iuka, Miss., Burnsville, Corinth, Essary Springs, Tenn., Saulsbury, Grand Junction, La Grange, Moscow, Piperton, Collierville, Germantown, and Memphis.

It is 120 miles to Sumner, Miss., through Lynchburg, Glover, Lake Cormorant, Clacks, Robinsonville, Hollywood, Tunica, Clayton, Dundee, Rich, Coahoma, Cloverhill, Clarksdale, Tutwiler, Sumner; then 165 miles to Jackson through Whitehead, Glendora, Schlater, Greenwood, Lexington, Franklin, Goodman, Pickens, Canton, Madison, Ridge-land; Jackson to Baton Rouge, La., is 179 miles, and the towns between Terry, Crystal Springs, Hazlehurst, Beauregard, Brookhaven, Johnston, Magnolia, Osyka, Kentwood, Greensburg, and Baton Rouge. Following along the Mississippi river 119 miles is the last stretch, the routing being Darrow, La Place and Kenner.

to La Trappe following the new route to Hatboro, Ambler, Norristown and Coatesville. From this point there is a good dirt and macadam road leading southwest from Coatesville to Conowingo, a distance of 38.4 miles.

From Conowingo the route goes through Belair and Lochraven on Blue Rock Route 274, a distance of 45.2 miles, making the total mileage from New York to Baltimore 196½ miles, as compared with the old route through Philadelphia and Newark, which is longer and vastly inferior in quality.

Philadelphia motorists can use the Coatesville route, as there are no places on this stretch as bad as on the road by the way of Chester and Wilmington, although it is fifteen miles longer.

This route will be recommended to motorists en route from New York, south through to Baltimore and Washington, as it will

Arkansas to Forest City, 49 miles through Mound City, Marion and Madison, over very poor sand and dirt roads, then 70 miles north to Jonesboro over clay and gravel roads through Colt, Wynne, Whitehall, Harrisburg and Greenfield. Cape Girardeau, Mo., is a distance of 154 miles over gravel and dirt roads through Brookland, Paragould, Marmaduke, Rector, Piggott, St. Francis, Campbell, Dexter, Bloomfield, Aquilla, Allenville and Dutchtown. Go through Jackson, Fruitland, Appleton, Uniontown, Longtown, Perryville, Lithium and Clary 52 miles to the Mississippi river, crossing to Chester, Ill., and routing through Centralia, Salem, Omega, Farina, Laclede, Edgewood, Mason, Watson, Effingham, Teutopolis, Woodbury, Jewett, Vevay, Casey, Oakleaf and Martinsville. From Chester to Martinsville the roads are natural dirt and the distance is in the neighborhood of 164 miles.

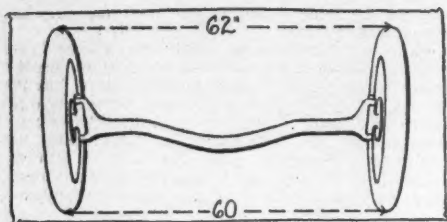


FIG. 1—FRONT VIEW OF SPREAD WHEELS

Lining Up Front Wheels

Georgian's Tires Grind and Wear Off Tread Because of Misalignment of Wheels

MADISON, Ga.—Editor Motor Age—Will Motor Age please tell me what is meant by the front wheels of a motor car being in line or alignment? My car, a Buick 1912, model 35, dropped in a ditch 10 inches deep and bent the steering rods under the car. Then the rubber on the treads of the wheels wore away soon. Now they say the front wheels are out of line. I put in a new steering arm as I thought it was bent, but I see no difference. Now all rods are straight, what am I to do? This is the position of the wheels—See Figs. 1 and 2.

Now when I draw in the rear rims of the front wheels to 60 inches, it throws the front rims of the front wheels about 1 inch wider than the rear portions, making the wheels 60 inches apart behind, and 62 inches apart in the front of the wheels.

It seems to me that I read somewhere that the front wheels should be at least 3 inches wider angle than the rear wheels, am I right? It seems impossible in my car to place the front wheels 60 inches apart for both the front and rear of the wheels, i. e.—I can't make them both the same, if they should be the same. What is my trouble? The axle does not seem to be bent. It is a tubular axle. I can change the position of the front wheels by shortening or lengthening the connecting rod under the car. Should the rear and the front wheels be the same distance apart, or not?—A Subscriber.

To properly understand the following explanation, an understanding of the principle of camber and gather is first of all essential, and to this end, Motor Age would advise that you read the answer to J. W. on page 26, first column of the issue of September 26. According to your diagrams, your wheels are spraddling out, which results in a grinding of the tread. This is because your front wheels are cambered, i. e.—their lowermost portions are closer together than their uppermost portions. This gives them a tendency to run away from each other, or in other words, their true tracks diverge, if set parallel. To correct this tendency, they should be set at a gather, viz.—their front portions set closer together than their rear portions, this brings their tracks parallel. The result is that while

The Readers

How Increase of Camber and Loss of Gather Affects Wear of Tires—Term Stock Cars Is Strict, Stock Chassis More Flexible—Carpenter Is Questioned

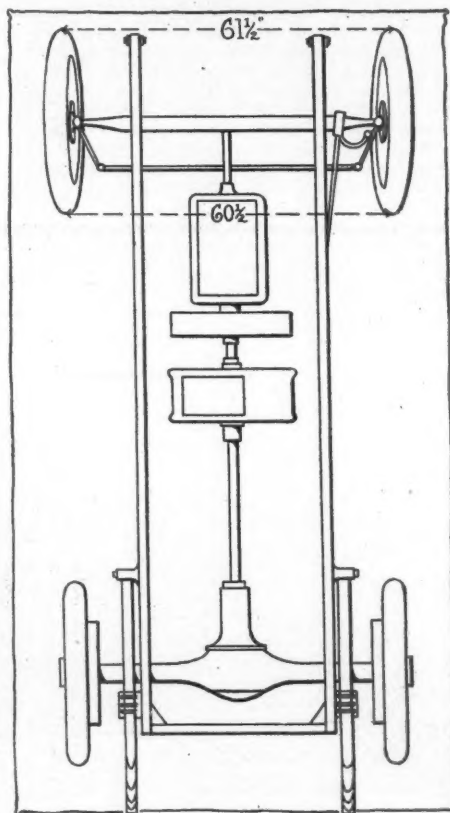


FIG. 2—BAD POSITION OF WHEELS ON GEORGIAN'S CAR

the wheels themselves are parallel in no particular, their paths of rolling are, and the result is that they travel naturally in a straight line, with a true rolling contact with the road, and do not grind the tires. If on the other hand they are set with a spraddle, the effect will be to aggravate the grinding tendency that is present when they are set straight. The rear wheels, you have noticed, are set parallel as in Fig. 4. This is right, as they turn on a common axis, without camber, so that they run in a straight line when set parallel. Referring to Fig. 3, it will be seen that the front wheels are actually wider apart at their centers than the rear wheels, and that their spread is greater. Owing to their camber, and the disposition of the steering knuckles, they nevertheless travel in the same track as the rear wheels. The gather of the front wheels brings their rear portions wider apart, so that while the fronts of the wheels are 60 inches apart, the rear portions of the tires are 62 inches apart. This is the ideal setting for front wheels, viz.—the gather

equal to the tread of the wheels, so that the wheel leads in lines parallel to the track. This disposition is shown in Figs. 3 and 5.

To correct your fault, first see that the track of the front wheels is 60 inches. Next, with the aid of a carpenter's large square or a plumb line, see that the wheels are of equal camber. To do this, the car must be on a level floor, and both tires applied and fully inflated. It being determined that the axle itself is true, the next step is to turn the wheels to a position, as near as can be judged, dead ahead. Then adjust the length of the drag link, or tie rod so that the wheels are 60 inches apart in front and 62 inches apart in the rear. To determine whether or not the wheels are gathered equally, with a rod or tape measure see that the front portions of the tires are at equal distances from the tread point of the opposite tire. If not, this adjustment may be made by adjusting the length of the longitudinal steering rod.

This adjustment will give you a perfectly true-running pair of wheels, which will steer freely, and run with a true road contact, although such a setting will be rather more radical than was intended on your car. The correct angle for the Buick 35 is with only $\frac{3}{8}$ inch difference in width between centers of the tire at the top and bottom, and the front and rear, respectively, or in other words, between the wheel track and the wheel spread. Your trouble is that your spindles have become bent downwardly, thus increasing your camber, and throwing the gather out of adjustment. This may be corrected by bending the axle back to its original shape with the top portions of the wheels $\frac{3}{8}$ inch wider apart than the tread portions, or by the above process, readjusting for the increased camber. In any event, the wheel must lead in a true plane, or in other words, the center of the front of the wheels must be equidistant with the centers of the tread portions, as shown in the diagram, Fig. 6.

DEFINITION OF STOCK CARS

Garwin, Ia.—Editor Motor Age—Are the materials used in the motors, transmissions, axles, wheels, frames, etc., of the stock cars in road races of the same material as used in the cars purchased by the public? Also, are the magnetos and carbureters specially built?

Clearing House

Benzine a Good Fuel—Cheap and Effective Tappet Adjustment on Ford—Duryea the Genesis of Sixes—How Minnesotan Fixes Tire Pump

2—Could a young man, if he proved competent, secure a position as tester in a factory without having to work up to that position?—A Subscriber.

1—The term stock has a definite meaning that is generally understood. Under the A. A. A. rules, a stock car is allowed no changes whatever from standard practice. Stock chassis, however, are not restricted so severely. The definition of a stock chassis under the A. A. A. rules, which is adhered to in all contests sanctioned by that body, admits of changes in the weight and thickness of springs, but restricts their length and breadth to standard; of piston diameter; of the angle of the steering post; length and angle of control levers; change of gear ratio, wheel diameters excepted; tire and rim equipment; length of pedals; body, fuel tanks; exhaust piping; the use of shock absorbers; winding of springs; hoods may be cut away; mud guards and radiator fenders; and changes in lubrication. Magneto and carbureters are not exempt.

2—In the first place, no man is competent to act as a tester of motor cars without considerable experience in driving, and a great deal in the manufacturing of the particular machine which he is to test. So intimately connected are the duties of the assembler and the tester, that in many factories, even those whose employes number into the hundreds, prefer to have the assemblers test the cars personally, instead of trusting them to a disinterested tester.

BENZINE FOR THE CAR

Sylvania, Ga.—Editor Motor Age—What is the gear ratio of the White gasoline, 1910 model, in third and fourth speeds?

2—If the White car is able to do 50 miles per hour as a stock car, what should it do stripped?

3—What is the horsepower of the White car?

4—Can I successfully use benzine as a fuel? Is it more dangerous than gasoline?

5—What changes do I have to make?

6—Give names of several concerns from which I may obtain small bucket seats and round gasoline tank.—Geo. H. Hilton.

1—The 1910 White gasoline car was geared at 4.25 to 1 on third speed or direct drive, and 3.45 on fourth speed.

2—The highest recorded speed of a stock White chassis, stripped for racing is 55 miles per hour, which was done by a 30 in 1910.

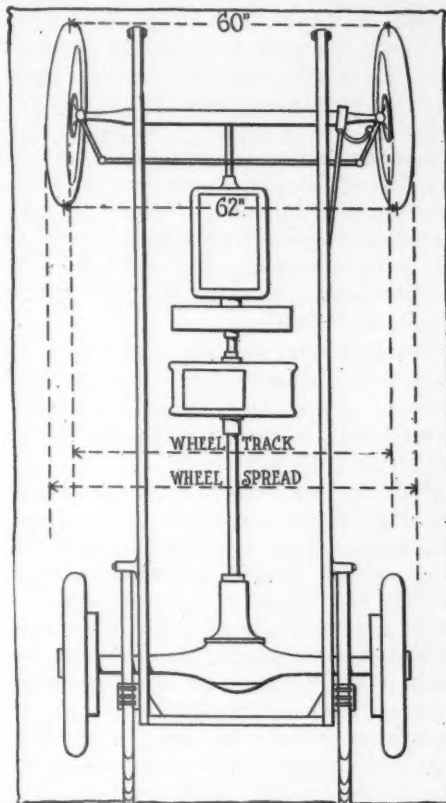


FIG. 3—HOW GEORGIAN'S WHEELS SHOULD BE LINED UP

3—At 1,000 revolutions per minute, the 30 develops 25 brake horsepower; the 40, shows 35; and the 60, 32 horsepower.

4—Benzine may be successfully used, under proper conditions, for a motor fuel. It is less dangerous than gasoline, as it is a heavier and less volatile distillate of petroleum.

5—The only changes necessary are adjustments, to adapt the carburetor to the difference in viscosity of the new fuel, and its slightly lower fuel intensity. Only the most advanced types of water-jacketed carbureters are adapted, however, to satisfactory service with this fuel.

6—The Times Square Automobile Co., Chicago; the Chicago Coach and Carriage Co., Chicago.

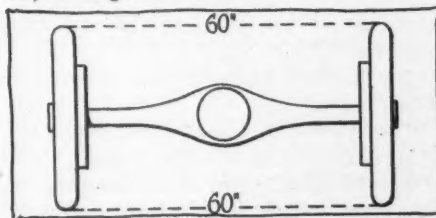


FIG. 4—REAR WHEELS ARE STRAIGHT

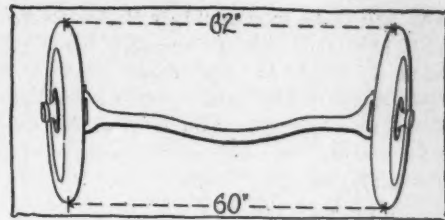


FIG. 5—AS WHEELS SHOULD LOOK

Repairing a Tire Pump

Sauk Center Sage Finds the Tire Pump Is Easy To Fix After Analytical Diagnosis

S AUK CENTER, Minn.—Editor Motor Age—Did you ever undertake to repair a tire pump when it would put only about 1 pound of air into a tire with about fifteen strokes to get the pound? Well, I guess not! The other day my tire got a little below pressure mark, and I tried to pump it up to standard. I used all the tricks known to me in the pump line and I could not get that pump to pump. I nearly broke my back, and finally gave in. I decided to take the pump to a garage and either trade it off or get it repaired so it would put air in a tire. I took it to the repair man and meekly asked if he knew anything about a compound pump. He briskly informed me that he was on his job in this respect. He took the pump from my hand and with an air of supreme knowledge said: "I think there is nothing wrong with this pump, unless it needs a new leather. However, I will trade this new one, compound, for \$3 and your pump."

This struck me as fair, and I called for the new pump, but on looking it over I concluded it was not as good make as the one I now owned, and which cost new just \$5 and had done good work until of late. So I concluded I would have him repair my pump. After working about 2 hours to fix it up he, with the air of a commanding general, said: "It will do business now, you bet." He handed me the pump and I, being a trifle suspicious of the medicine he had given the compound, asked him to try it on a car standing by with the tire partly down. He promptly complied with my request with results surprising to himself.

Before connecting the pump he tested the tire with a gauge and found it had 45 pounds of air in it. Then he connected the pump and gave it about fifty strokes, disconnected and tested, and found he had 45 pounds of air in the tire! He looked at the pump a moment and said: "You had better throw this thing away and buy a new pump. I won't bother with it longer." I meekly asked how much I owed him, and he informed me that the munificent sum of 25 cents would settle the bill, inasmuch as he had not done the pump much good.

I paid the sum asked and taking the pump home with me concluded: "What

man had done, man could do," if someone had invented this pump and made it work I could do the same thing. I took it apart and found: One steel ball with brass spring to hold it in place; one steel washer; one big leather washer and plunger; one steel washer; one cap nut, brass, to hold the ball and brass spring in place; one telescope brass tube, threaded on both ends to screw into the foot; one thick leather washer for cushion on inside of foot; one cone of brass, with male and female threads, with four $\frac{1}{8}$ -inch holes drilled in it, with a slit across the top to turn out the male bushing which held a thin leather washer in place.

I carefully made a note of the power required to force the air into the rubber hose and from there to the tire and noted that the down pressure of the plunger tube to which the handle was attached forced the air admitted at the top, into and up to the ball-valve, which was held by a check spring. I then looked over the center washer held between the male and female bushings and found my trouble.

This thin leather washer was worn so badly that as the up stroke of the pump was made it did not sufficiently close the four holes in the bottom part of the female bushing to permit the air gathered on the down stroke to be forced into the inside brass tube and from there into the tire. I had quite a time to get this bushing apart, but succeeded at last, and I put in place of the worn old washer a good new one, replaced all parts as they were and going to my tire found I could get 1 pound of air into it with just two strokes. A pump is a small thing, indeed, nevertheless it should be perfectly understood, as there is something wrong inside when it won't work.—A. D. Carpenter.

SPARK PLUG CEMENT

Parkston, S. D.—Editor Motor Age—Kindly publish a formula for a cement for pipe connections and spark plugs that will withstand heat and compression will dry without heating.—E. G. Meisenholder.

The following formula was published in Motor Age August 29, 1912: "A fireproof cement that becomes very hard when heated is prepared by mixing 180 parts of iron fillings, forty-five parts of lime, and eight parts of common salt, working the ingredients into a paste with strong vinegar. The cement should be perfectly air-dried before heating."

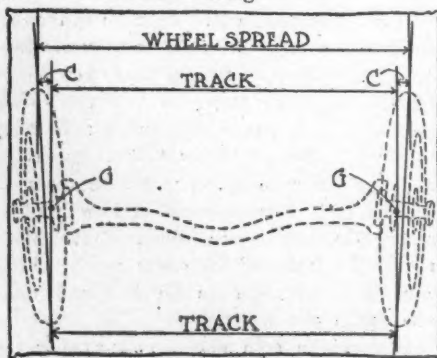


FIG. 6—THEORY OF WHEEL SETTING

Reader Discusses Editorial Doctor Finds that Comments of Motor Age on Reform of Service to Users of Cars Are Timely

MOLINE, Ill.—Editor Motor Age—Just to reinforce the editorials in the last two issues of Motor Age of September 12 and 19 on "Service Reform Needed" and "Tribulationes De Minutiis," I would like to submit a few more very pertinent illustrations. Service reform is needed. After running a new car for 2 months an owner found that the carburetor leaked badly and continually. An examination showed that the cork float had been poorly shellacked and had no longer enough buoyancy to shut off the flow of gasoline. An order for a new float took 11 days to fill. An order for two new fenders took 2 weeks to fill. An order for a new brake rod took 9 days to fill. An order for a new spring took 7 days to fill.

All these were simple parts requiring no complicated machining or adjusting; they were all ordered by telegraph from a Chicago branch house that supposedly carries a full stock of spare parts.

And the "tribulationes de minutiis!" Having bought a new car in the spring, the owner, a few days before it was delivered to him, sprained his wrist badly in a fall and consequently was unable to drive for awhile. Not being by any means a novice, he made use of this enforced idleness to inspect the new car thoroughly. Here is what he found to bear out the contention of Motor Age that "at the final testing department of the factory, with the customary American rush, the car equipment is marshaled into place with the speed of a military maneuver:"

1—The lock nut and washer on one of the torsion rods were fully $\frac{1}{2}$ inch from where they belonged, and were stuck fast in the paint:

2—The cross pieces on both the rear fender supports were cracked:

3—When stepping on the running board a sharp squeak in the hangers of one front and one rear spring was noticed.

4—The tire irons were large enough to hold a flat tire, but too narrow to hold an inflated one.

5—A leaky joint was found in the hot water connection of the carburetor.

6—The floor of the tool box under one of the seats was littered with tags, cushion hair, wood shavings and dried paint.

The first few days he was able to take the car out he ran down the following troubles:

1—The foot brake on both rear wheels was dragging.

2—A very distinct and disagreeable buzzing was heard in the timing gears.

3—The same noise was found in the rear axle.

4—The cover in the filler cap of the

gasoline tank was leaking, due to a defective screw thread.

5—The clutch pedal made a sharp grinding noise caused by its rubbing against one side of the too narrow slot.

Comment seems superfluous, except for the remark that a factory inspector with ordinary alertness and business judgment could and should avoid these defects. They create unnecessary trouble and dissatisfaction for an experienced driver and with a novice at the wheel some of these defects would surely have gone undetected until they have led to serious consequences.—Doctor.

ABSENCE OF SPARK KNOCK

Greenfield, Tenn.—Editor Motor Age—I recently drove a model Y Stevens-Duryea car some 6,000 miles over all kinds of roads without ever hearing a knock or pound in the motor, although frequently the car was slowed down on heavy grades or in deep sand to a very slow speed. There was no spark or preignition knock at any time even though the spark lever was carried well up toward the top of the quadrant at all times. A model M Chalmers 30, driven over the same roads pounds quickly unless the spark and throttle are carefully manipulated. The spark must be retarded on ascending slight grades and whenever the grade taxes the power of the motor the knocking continues even with the spark fully retarded. In both motors the timing and valve setting was done at the factory. Can Motor Age explain the difference in action of these motors?

2—When a motor pulling a moderate grade gives a preignition or spark knock with spark lever fully retarded, a knock that disappears when the throttle is closed a little, is it not an evidence that the compression carried is too high to get the highest torque at low speeds?

3—Instruction books generally speak of a knock that occurs when the motor is overtaxed, as in ascending a heavy grade. Is this knock due to preignition induced by high compression? —Harry C. Ward.

1—In comparing the behavior of two motors in this respect, it must first be remembered that the position of the spark lever is no indication of the actual position of the timing. The timing of your Stevens-Duryea may be a trifle late, and that of the Chalmers a trifle early in similar spark-lever positions. Your gear may be lower than that of the other car, and the fact that your motor is higher powered, and is a six, probably has an influence in the difference in performance.

If the spark is properly timed, and cylinders free of carbon, the Chalmers motor should prove more flexible than your report seems to indicate. A spark knock on a fully retarded spark indicates one of two things, all other engine parts functioning normally, either that the timing is excessively early, or that there is a considerable carbon deposit. High com-

pression might produce preignition, but it is to be doubted that any motor car motor could reach such a degree of compression, certainly not a standard motor such as the Chalmers. If the gear ratio on the Chalmers is too high for the weight of the body and load, it is possible that the overtaxing of the motor in this way would produce preignition under load, but with a fully retarded spark, this is doubtful.

2—The phenomenon of spark knocks with a late spark and open throttle is to be traced to the combination of early spark timing, and the natural suppression of the motor due to undue throttle openings at low speeds. With the spark retarded, it is evident that the motor would be running slowly. A wide-open throttle at such a speed would choke off the motor. This choking would further reduce the speed, so that the abnormally early spark on full retard would cause ignition to take place before dead center.

Of course late exhaust valves would have the same effect, but it is not likely that these would be set wrong at the factory, and unless changed subsequently, they could not get out of time unless as a result of excessive cam wear. The effect of the high compression for low speeds that results from excessive throttle openings, is to increase the speed of the motor, rather than retard it.

3—No. It is due to decreased speed which renders the spark, normally right, too early. With a properly timed engine, however, this knock could not occur with the spark retarded, except on the dying revolutions of the engine, except through carbon deposit or overheat. Compression sufficient to ignite a charge of gas would have to reach a degree in excess of 400 pounds to the square inch. Compression in a motor car motor rarely exceeds 80.

FORD PUSHROD TAKE-UP

Grinnell, Iowa—Editor Motor Age—Kindly explain how to adjust Ford pushrods.

2. I have an Apple charging dynamo which refuses to work; at times it starts and charges for a second then stops as suddenly as it began. What is the trouble?

3. Give me some rules for charging storage batteries.—J. A. Hamor.

1. The Ford pushrods have no adjustment. To take up play the Ford Company has provided a means to this end consisting of little steel caps to be fitted over their ends. These will be furnished to Ford owners at the Chicago branch, gratis, on application.

2. The Apple Electric Co. advise that you correspond with them in regard to your difficulty. Their address is Dayton, Ohio.

3. Complete instructions for the charging of storage batteries was published in these columns, Aug. 15, 1912, under the title, "Charging with Exciter." These instructions were general in their scope, and will serve for any current source.

Likes Irreversible Gear

Pennsylvania Motorist Attacks Position of Gopher Expert Regarding Steering Gear Types

DUBOIS, Pa.—Editor Motor Age—I was very much surprised to see in Motor Age, September 26, an article by A. D. Carpenter in which he claims the superiority of the reversible type steering gear over the irreversible. I had thought Mr. Carpenter with his 8 years experience would be better able to judge the different types than it now seems.

I am presuming that in buying his first car it was medium in both price and weight. After selling this car, with which he learned and had some experience, a small car was bought. Better service is being returned from this car due to the excellent care it is receiving. Probably if this light car had been bought first the story would be entirely different, but it is needless to say that Mr. Carpenter never has recovered from that first car and judges all others by it.

The advantages of the irreversible steering gear are so apparent that it is hardly worth while enumerating them, but fearing that some motorists may not be familiar with the different types, I am going to answer this article.

The irreversible steering gear is used by more manufacturers than any other type, only the cheap cars using the reversible due to its cheapness in manufacturing. The competition in the cheap-car field is so great that it is a question of cost and not of which contains the most advantages.

Irreversible steering gears are constructed with adjustments for taking up lost motion and wear, it never being necessary to have lost motion in the steering wheel. This most likely was overlooked in Mr. Carpenter's first car or the steering gear was of such an antiquated type that its comparison with the ones we now have is useless.

The reversible type is a little the quicker if we wish to figure in the one thousandth part of a second, but there is such a thing as being too quick in regards to tire and machine wear. The irreversible type is sufficiently quick-acting for any one and never has been blamed for accidents caused by slowness to work. A well-lubricated gear will work with very little more effort and the difference in muscular energy required is so slight it is not worth speaking of.

In the high-priced cars we have combinations of the best types known to manufacturers. Why if the reversible type is the best do we not see just one high-priced car equipped with it? High-priced cars are equipped exclusively with irreversible steering gear. To say that this type of gear is complicated, awkward and heavy is only stating one's unfamiliarity with it,

for to the contrary it is very simple, compact and the difference in weight is really a joke.

Mr. Carpenter says that running in ruts and car tracks can only successfully be accomplished with his favorite type. Running in ruts never should be done as it works great injuries to tires. If the roads are so rough one is unable to straddle the ruts, then they are entirely too rough for motor use. Never should one drive in the car tracks, as the small steel shavings from the rails ruin tires the quickest of any abuse. Considering this, I hardly would call it an advantage in favor of this type.

The lubrication of steering gears is neglected more than any other part of the car, and I am sure any faults found with them are due directly to this neglect.

The great feature of the irreversible steering gear is that none of the road shocks are transmitted to the driver's arms. Mr. Carpenter likens his type to a bicycle which one may ride on a smooth road without touching the handlebars, but he fails to state that the first inequality in the road will land the rider in the ditch. Each shock given to a wheel with a reversible steering gear is felt in the driver's arms and is the reason for drivers becoming tired much quicker with this type than the other. In striking an obstruction in the road with an irreversible steering gear there is no danger of the wheel being jerked from one's hands, which is not true of the reversible, hence the superior safety of the former.

I have driven cars of all models and types since 1902 and my preference at all times is an irreversible steering gear.—W. J. Marlin.

AMERICA'S PIONEER SIX

Prescott, Iowa.—Editor Motor Age—There has been so much discussion regarding the first motor car company to adopt a six-cylinder motor that I would like to be enlightened on the subject.—W. H. Hackler.

Claim is made, and few dispute it, that the first six-cylinder motor car made in this country is the idea of Hinsdale Smith, of the Springfield Metal Body Co., Springfield, Mass., a concern which originally made metal cornices. Mr. Smith built the engine in 1904, and at that time it is said did not have enough money to buy a body for it. Because of this lack of finances, Smith constructed a metal body for the car which, by the way, is said to have been the origin of the metal body business in this country. Frank Duryea, of the Stevens-Duryea company, saw Smith's car in operation on the road, and through his endeavors the Stevens-Duryea company brought out this first six-cylinder in the fall of 1905. Hardly had the new Stevens been out than Henry Ford took a liking to the six and the six-cylinder Ford was introduced to the market in 1906, being followed a few months later by the National six and Pierce six.

The Realm of the Commercial Car

BIG MOTOR ASH WAGON

A 15-ton capacity ash wagon drawn by a Martin tractor is one of the products of the Knox Automobile Co. The wagon is 12 feet in height and 26 feet in length, and looks very much like a house moving down the street. The wagon was built for the Borough Development Co., of Brooklyn, to take 15 tons of ashes at a load and to stand a speed of 8 miles an hour. It is shod all around with steel tires which will be used until the snow makes its appearance when the front wheels of the wagon, which are the drivers, will have rubber tires fitted for winter wear. The heavy load, however, is at all times carried on steel tires.



MARTIN TRACTOR HAULING 15-TON KNOX ASH CART



WINTER USE OF TRUCK ON FARM. NOTE THE TIRE CHAINS ON REAR WHEELS

By William B. Stout

ONE of the great advantages of the motor truck over horsed wagons is its ability to get about and work almost to full capacity, even under the worst of weather conditions and over road surfaces impossible to animal hauled vehicles.

Early motor delivery vehicles were built to meet local conditions, and many of them at that were designed only to meet the conditions obtaining at the time of their building with little reference to troubles which might arise with change of temperature or if the machine should happen to be out in the rain during some time of its service.

One of the Old Timers

The writer remembers an old Benz belt-drive horseless carriage which appeared in the early days of the motor car as the wonder of the small city in which he lived at the time. This machine was fitted with large wheels at the rear and small wheels in front, 90 per cent of the load being carried directly above the rear axle. The

Equipping Trucks for Winter Work

One Need Is to Keep Oil Warm—Another Is to See That Radiator Does Not Freeze Up—Protecting Driver from Inclemency of Weather—Other Zero Precautions

motor developed about 4 horsepower and on low gear—the lever working this contrivance being known as the digger—was geared down to a ratio of about 20 to 1. The machine actually would run on the level for several miles at a time, the designer having evidently intended that the machine should always work on level roads, for on throwing in the digger one day on a rather sharp hill and just at a street crossing, the front end of the car reared up and the whole contrivance turned over on its back with the rear axle as a pivot. This early machine was designed to fulfill but one condition.

Motor trucks went through more or less the same crude stage as the motor car, but though based on car experience, the development of the freight vehicle was more rapid. Many of the earlier machines, however, were ill fitted to meet severe winter conditions.

Variations in Climate

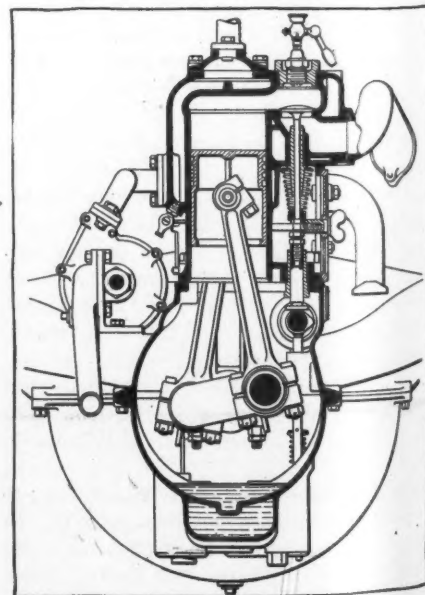
The modern machine may be sold to work in the hottest of climates, and yet find its way a few seasons later to some north country, where it will be forced to work for a large part of its time in below zero weather. The motor truck must be able to work efficiently under all conditions.

One of the first troubles met with by motor trucks which were sent further north from their manufacturing point was the freezing up of the oil supply. Many of the engines of those early days were fitted with separate oilers driven off the engine shaft and located in various parts under the hood. For summer work there was no trouble, but as soon as cold weather was encountered the oil congealed and refused to flow, resulting in many a seized motor and large repair bill. In zero

weather this trouble was obviated and the cars kept running by mixing with the oil a certain percentage of kerosene, but this was at best a makeshift.

The Packard company got around oil difficulties in cold weather by placing the oil reservoir at one side between the cylinders of the motor, the heat of the waterjackets keeping the oil always at a good working temperature. Other motors solved the same problem by the oil sump method, all of the oil being carried in the bottom of the crankcase.

In the modern motor truck there is almost no oiling trouble. Whereas a few years ago it was no uncommon sight to see stranded motor trucks strung along University avenue connecting St. Paul and Minneapolis on almost any stormy or 30-



KEEPING OIL WARM IN WINTER. CRANE CASE OIL SUMP TYPE OF MOTOR

degree-below-zero day, last winter saw but few trucks held up even in this northerly climate by temperature conditions.

A trouble met in a larger section of the country is due to the freezing up or blocking of the radiator in snowy weather. Freezing may be obviated by the use of solution in with the cooling water, which has been described too many times to need repetition here.

To shut off some of the cooling surface during cold weather many devices are used. Some merely tie a piece of cardboard over the front of the radiator, in the form of an oilcloth curtain arranged much as in the drawing, fitted to a shade roller beneath at the bottom of the radiator and fastened above at any height desired by a little wire clip with wing nuts, as shown in the sketches annexed. This curtain could be raised to any height, depending on the temperature and to fit the weather conditions of the day, shutting off from the draft of air as much of the radiator as was thought necessary.

Watch the Radiators

During heavy snow storms with wind it is necessary to watch radiators closely to see that they do not become packed with snow. The curtain shown will get rid of this difficulty to a certain extent.

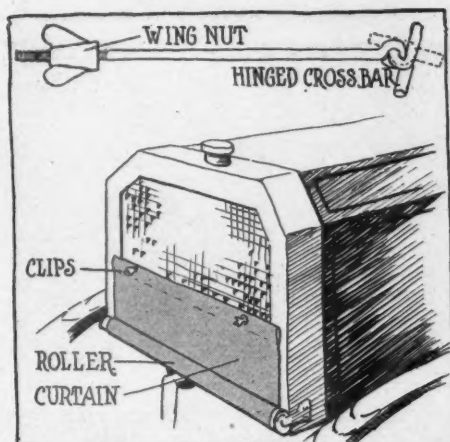
Of course, every car or motor truck should be fitted with drain taps, so that in case of motor stoppage for any reason all the water may be drained off from the whole cooling system, or cracked cylinders may result. Although most of the water may be drained from the bottom of the radiator, or from other suitable tap, yet it is always well to have the water pump fitted with a tap also, so that every drop of water may be taken from it. If this is not done but a few drops of water in the bottom of the pump case may result in shearing off the pump shaft on starting. At best it takes careful watching and attention to keep the motor truck power plant in good condition on really, cold days.

The machinery itself is not all that needs watching in winter weather, for in climates where extreme cold is met the driver must have extra protection in order to work efficiently. It is rather significant that the Wilcox motor trucks, built in Minnesota, are practically all fitted with a comfortable inclosed cab for the driver.

Protecting the Driver

As to the cab construction, there is some discussion as to whether a built-up wooden cab is as good a proposition all around as the windshield and roof with side-curtains. It is very hard to make a wooden cab that is light and at the same time noiseless. There is a deal of vibration in driving over frozen roads at best, and when one has a cab about him which accentuates the roaring, it has a certain disadvantage.

Most motor trucks work well on almost any kind of surface in winter, and yet



WINTER CURTAIN FOR RADIATOR PROTECTS FROM SNOW AND REGULATES WATER TEMPERATURE

once in a while there is need for a real non-skid device which will fulfill all the conditions in preventing the slipping of wheels and skidding and yet use up but little power and not cut the tire. There are several non-skid devices which fulfill some of these conditions, but none fulfills all. To date block tires on the rear wheels have proved as efficient as any non-skid device for work about Chicago. The industry awaits a real non-skid device for hard tires.

Delivering Perishable Goods

R. R. Anderson, a Chicago dealer in fruits and produce, has stated that one of the biggest advantages that he has found in the use of a motor truck for his delivery work has been that in winter time he can deliver perishable goods, such as potatoes, tomatoes and the like to customers at a distance without danger of freezing. The ability to do this has gained him much trade during the past season. Preparing his car for this work, the inclosed body is lined with several thicknesses of building paper, which in this case prove quite sufficient to prevent loads of potatoes, for instance, from freezing on a 15-mile haul at 18 degrees below zero. For work further north, as in Minnesota and the Da-

kotas, it might be advisable to supplement this with some sort of heater worked from the exhaust, an arrangement very easy to fix. The Wilcox motor truck cabs are warmed by the heat of the engine itself, but a body at the rear used in service, such as has just been described, could easily be fitted with a radiator connected with the exhaust pipes and which could be connected or disconnected at will.

Cost of Cheap Driver

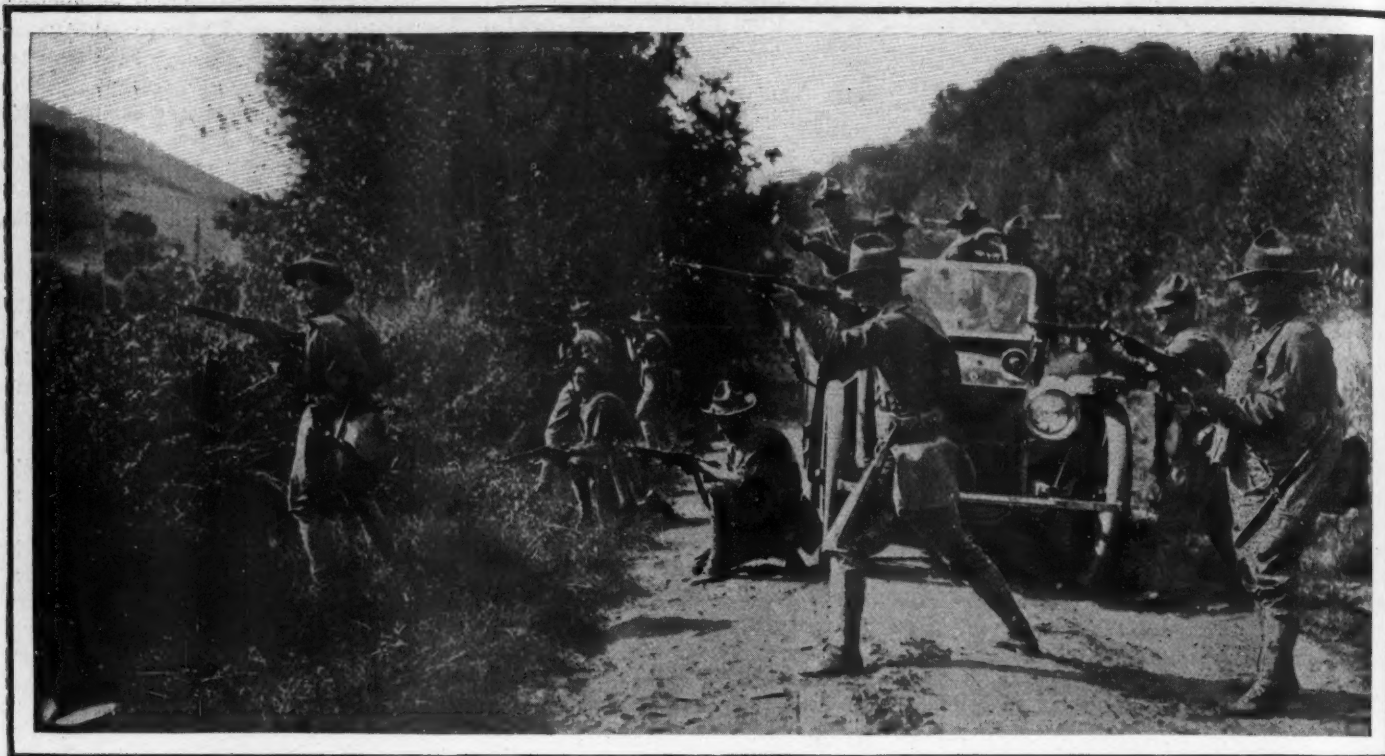
After all has been done that is possible by the manufacturer, the final achievements and possibilities of the truck will be brought out only by the driver himself, and a cheap driver for winter work is poor economy.

Last winter, passing by the McCormick building in Chicago, the writer noticed a large motor truck unloading coal and stopped to watch the operation and check up the time. The truck was backed in an alley down which the wind was sweeping at a terrific rate, the temperature being several degrees below zero. The driver had left the motor running but, as the writer watched other operations, it suddenly stopped. At once the driver stepped down from the coal wagon and tried to crank the motor, which failed to respond after several minutes of effort. The radiator of the car was about level with the building line and facing the street, so that all the people passing were walking directly in front of the motor truck as they crossed the alley. When the driver saw that he could not start the motor, he opened the tap at the bottom of the radiator and allowed several pailfuls of hot water to run out and down across the alley-way to the street directly across the line of pedestrian travel in front of the car. In less than a minute this water froze into a glare of ice. To cross the alley pedestrians had to step down one step, and it was at the bottom of this step that the greater part of the water congealed.

Within 5 minutes three people had slipped and fallen at this point. Someone



CABS ARE DEMANDED BY DRIVERS IN NORTHERN CLIMATES. SHOWING A MOTOR TRUCK AT FORT SNELLING, MINN. THE TEMPERATURE HERE VARIES FROM 100 IN THE SHADE IN SUMMER TO 40 BELOW IN WINTER



MOTOR SCOUTING DETAIL SURPRISING ENEMY IN MIMIC WARFARE IN CALIFORNIA

THE value of the motor car was thoroughly demonstrated during the recent mimic warfare in California when more than 10,500 troops, divided into red and blue armies, attempted the theoretical invasion and defense of our Pacific sea-board. Only one motor car was allowed within the fighting zone, which covered several square miles of territory.

The car was constantly in use during the maneuvers, and following are some of its tasks: It was used as an ambulance in at least two emergency cases; it took the place of five horses in transporting four officers and an orderly to whatever part of the fighting zone their duties called them; it hauled supplies and ammunition to various parts of the camp and to far outlying points where troops were on outpost duty; it brought officers from far distances when unexpected orders came for sudden moves in the war game; its gas tank, attached for the occasion, made the task of pitching camp after nightfall much easier than it would otherwise have been; its owner, an officer, lighted his tent from the electric lighting and starting system; visitors to the camp and battlefield were transported with such speed that they could watch the working out of an entire big war problem. The car used in the war game was an American underslung Model 56, owned by Captain F. A. Marriot, quartermaster of the Fifth California Infantry, and was attached to that regiment, which was part of the red or defending army.

spoke to the driver about throwing ashes on the ice, but he made no attempt to cover it. When the writer left the ice was still there. Returning a half an hour later it was found that ashes had been thrown over the spot, but on inquiry it was learned that this was done only after a woman had fallen at this point and broken her wrist.

This story has nothing to do with the design of motor trucks for winter use, but it does have to do with the cost of operation of a motor truck when handled by a cheap driver who is too lazy and indifferent to use his brains in the interest of his employer. A good motor truck driver is a valuable asset to any firm, and to be a really efficient driver his mental standard should be as much higher than that of a horse driver as the new delivery system is above the old horse system.

If the same business methods are used in connection with motor truck hauling, then no more brains is required than when horses are used, but real success with motor trucks can only be had by really fitting all systems to the new machine, rather than trying to adapt the machine to old conditions. For either summer or winter work it takes brains to make trucks pay.

Motor Trucking in Cold Weather

Experiment Being Tried in White Pass and Yukon Route Which May Result in Demand for Power Vehicles—Economy of Operation Already Demonstrated

By F. K. Haskell

WHETHER motor truck manufacturers will invade Alaska and the Yukon country depends much on the outcome of an experiment in motor transportation now being tried on the White pass and Yukon route, and another one that will be tried at Nome soon.

Transportation is the biggest problem of the northland, and if the attempt to solve it with the aid of motor cars proves successful the gasoline-driven power machine is bound to play an important part in the development of that rich resourceful land.

The topography along the White pass and Yukon route and that of Seward peninsula to the north are radically different. Surrounding Nome are great areas of gently sloping land covered with tundra, while the old Dawson trail, the scene of the first motor experiment, cuts through mountains for the most part.

With its southern terminus at Skagway, the White pass and Yukon route operates 111 miles of railway through the mountains to its northern rail terminus at White Horse. From there on to Dawson, 330 miles, the rail and stage division is operated. During the summer months steamers ply the Yukon river to Dawson, but in winter sleighs, wagons and horse-drawn vehicles are requisitioned and a tri-weekly service obtains over the old Dawson trail, which is now a government road.

With the price of hay averaging over \$100 a ton, the maintenance of horses alone comes high. Added to this is the cost of upkeep and operation of roadhouses which with other incidentals brings the bill up to \$200,000 per annum.

On the other hand, gasoline costs in the neighborhood of 30 cents per gallon. In the 2 years since the railway began its

experiments in motor cars a considerable saving has resulted from the operation of a light passenger car. At present the route's equipment consists of a Winton six 1909 car that has been rebuilt; one Knox 2-ton truck, a Holt caterpillar and an English caterpillar.

The Winton only has room for passengers and carries no freight. Its service, however, has resulted in a large saving to the company. The Knox truck is employed in making short runs. Although it has not been in operation long enough to demonstrate its ability, indications are that it will likewise prove a good investment. The Holt caterpillar has been a success. It was purchased in the fall of 1911. Its average speed is about 3 miles per hour, making it available only for freight. The English caterpillar was too unwieldy and is being repacked for shipment back to England.

American motor trucks will be used at Nome. Recently the Consolidated Development Co. purchased three 1-ton Federal trucks, which will be operated on the peninsula this winter carrying ore from the company's mines to the coast.

Alaskans declare a fortune awaits the enterprising manufacturer who is willing to take a chance, because an efficient motor could be operated so cheaply that freight charges could be cut into deeply and "big money" still be made by power wagon operators.

ELECTRIC HAULS 40 TONS

A remarkable performance of the motor truck was that in Rochester, N. Y., when a General Electric motor truck of 6-ton carrying capacity, hauled across the West Avenue bridge over the Erie canal a steel girder weighing 35 tons, two other motor trucks and track, the total weight being



WILSON TRUCK WITH CARRYING SPACE OVER DRIVER

NOWADAYS the big moving companies depend almost altogether upon motor wagons and even though they have more capacity than with horse-drawn rigs, still every inch of available space is used. Something new has been brought out in a Wilcox truck built for a Philadelphia concern. In this considerable room for stowing away little things has been secured by a compartment which is placed above the driver's head, as is shown in the illustration.

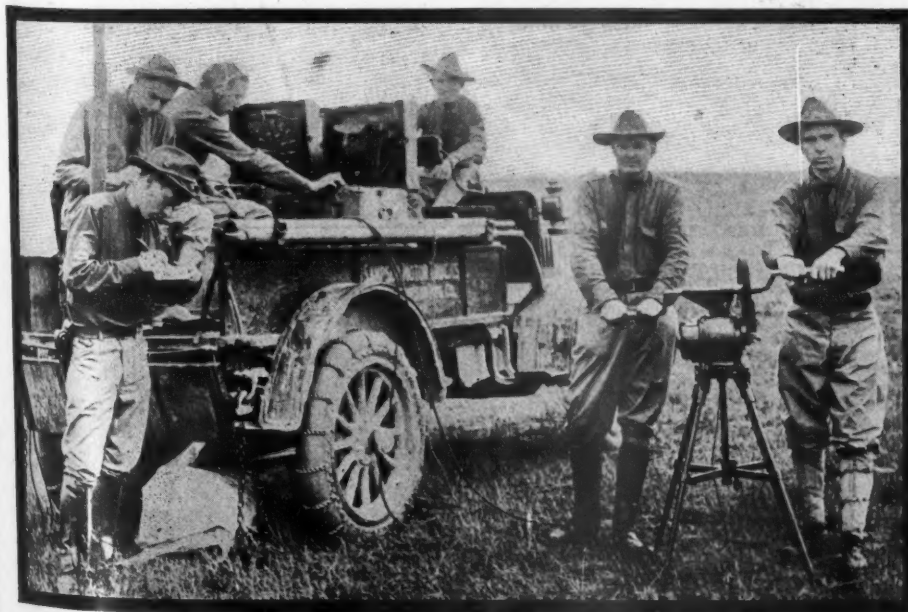
about 40 tons, displacing fourteen horses which were unable to even budge the immense load. The steel girder was shipped from Pittsburgh to this city over the Buffalo, Rochester and Pittsburgh Railroad for use in the construction of an addition to the McCurdy & Norwell store. It weighed 35 tons and was 60 feet in length. The Rochester Carting Co. was assigned to convey the girder from the railroad yards to the store. With the aid of heavy jacks, twenty men and fourteen horses the girder

was moved from the railroad car to two of the carting concern's big motor trucks.

Had the trucks been dragged onto the bridge floor with its immense load the weight would have crushed through the bridge flooring, as each plank of the flooring would have crumbled under the wheels of the trucks as they came to them. Planks were taken from a wagon which accompanied the moving force and laid on the bridge in front of the wheels. Horses were taken off the front of the trucks and hitched to the sides. Wheels were blocked to prevent their backing up under the terrific strain. The fourteen horses became unsteady and there was danger of the truck wheels leaving the planks and breaking through the bridge.

It was the failure of the horses to even budge the wheels of the trucks that prompted the workmen to unhitch the fourteen horses to give the third motor truck a chance to show its pulling power. The power of the truck was thrown on and the great tow rope stretched itself and quivered under the strain. Bystanders shook their heads, declaring that a 6-ton truck never could do the work, but the humming of the motor redoubled, the wheels of the truck began to turn and the great load advanced on the planking.

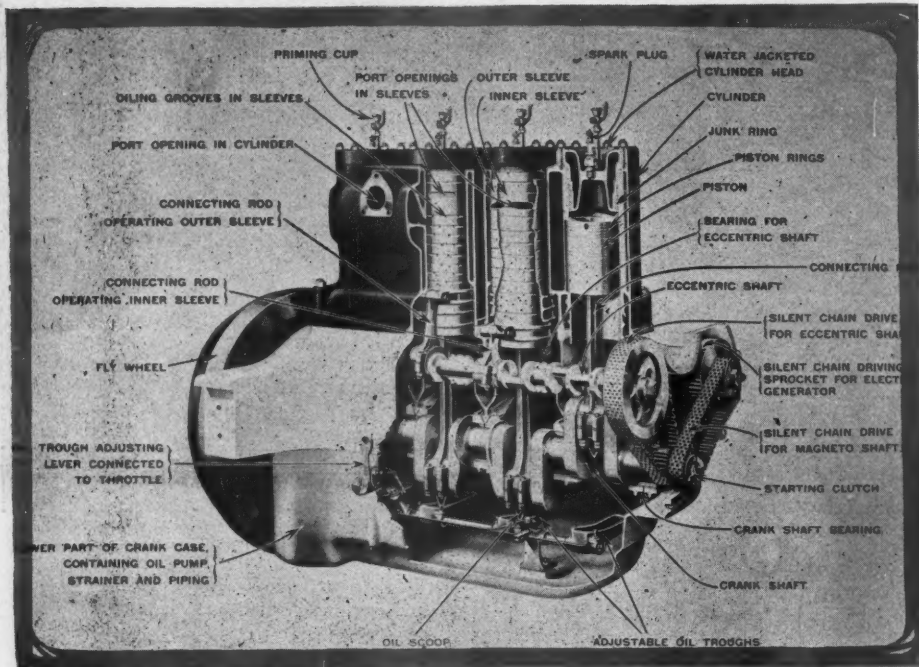
As fast as the carrying trucks were dragged onto one set of planking, those behind were carried forward and laid straight and the motor truck moved forward. Big plates of sheet iron were laid where the planks joined, but they curled up under pressure of passing wheels. After the bridge was crossed, the horses were again hitched to the two motor trucks, the third truck being then released.



MOTOR TRUCK CARRYING WIRELESS FOR SIGNAL CORPS

A FEATURE of the recent military maneuvers of the Michigan militia was the use of a 1500-pound Sampson truck which carried the signal corps which was fitted out with wireless apparatus. The truck carried not only the men but the equipment as well and so well did it do its work that since the trials the militia officers have been singing its praises.

Stearns-Knight Sleeve-Valve Motor

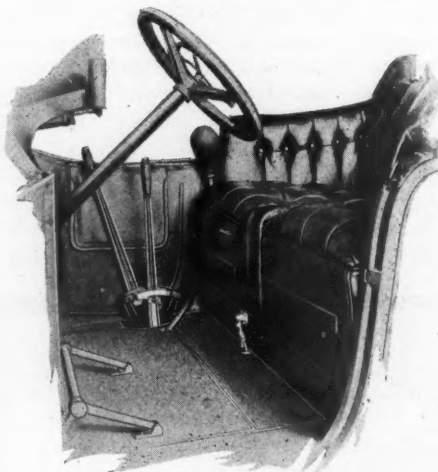


SECTIONAL VIEW OF STEARNS-KNIGHT SLEEVE-VALVE MOTOR
Showing the silent chain timing drive and the parts of the sliding sleeves

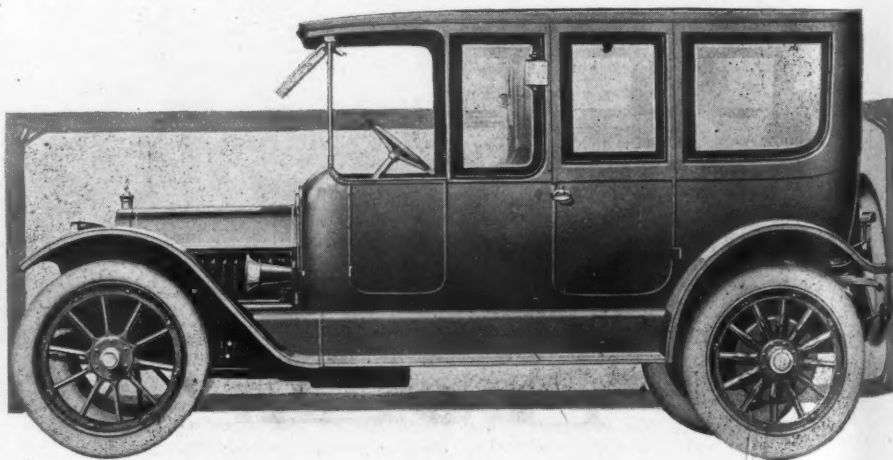
IN July, 1911, the F. B. Stearns Co., Cleveland, adopted the Knight type of sleeve-valve motor. After a little over a year of its use in all the cars which it has manufactured, the concern feels that it was justified in the change and announces that it is well satisfied with the result. In fact, the Knight engine is to be used in all the concern's four-cylinder cars for 1913, as well as in the new six-cylinder type, which is still in its development stage, and the details of which the Stearns company is unwilling to divulge at the present time. It is given out, however, that the new six Stearns-Knight motor will have the same bore as the four—4¼ inches, while the stroke will be slightly longer than that of the four, which is 5½ inches. The stroke of the six will be 5¾ inches.

No changes whatever have been made mechanically in the four-cylinder Stearns-Knight motor for 1913. In fact, it is stated that so thoroughly did the Stearns engineers go over the engine before it was adopted as the one and only Stearns type of power plant, that the year's experience with it has brought no defects to light. The wheelbases of the three four-cylinder body types are 116, 121 and 127 inches for the roadster, five-passenger and seven-passenger machines, respectively. Limousines and landaulets will be mounted on either the 121 or 127-inch chassis. The six-cylinder bodies will be mounted on chassis having wheelbases of 134 and 140 inches, depending on the type of body.

The cylinder dimensions of the four-cylinder motor, as given above, give a stroke-bore ratio of 1.29 and the horse-



FRONT SEATS AND CONTROL MECHANISM
OF STEARNS-KNIGHT ROADSTER



1913 STEARNS KNIGHT WITH LIMOUSINE BODY

Mechanical Alterations Are Absent in Product of Cleveland Plant

power, according to the inaccurate S. A. E. formula, is 28.9, a figure much below the actual power of the motor at running speed. It will develop this horsepower at a speed of 800 revolutions per minute, while its maximum output is about 64 horsepower at 2,400 revolutions. Naturally its torque, or turning effort, is least at this speed, being 124 pounds. The maximum torque of 181 pounds is at a crankshaft speed of about 1,100 revolutions per minute. In test, the car has required about 160 pounds torque from the motor to start, which means a horsepower somewhere in the neighborhood of 10.

Before finally pinning their fate to the sleeve-valve creation of Chas. Y. Knight, the Stearns designers worked out extensive improvements in the inventor's conventional type of engine. These improvements were sanctioned by Knight and later adopted, at least in principle, by several concerns abroad. One difficulty which was formerly experienced with the Knight motor was to get it to idle successfully, that is, to pull evenly when running at low speed under no load. After making many tests, the Stearns engineers became convinced that the difficulty lay in the entrance of a slight amount of air through the exhaust port. This port, when not open, was thought to be hermetically sealed, but by means of several delicate tests it was found that there was a slight amount of leakage between the concentric sleeves, the cylinder wall and the piston. Having thus located the trouble, it was a simple matter to remedy it, although just how this was done the Stearns company refuses to divulge.

A change in the oiling system from that used by Knight was also made. The movable troughs into which the ends of the connecting rods dip were retained as Knight

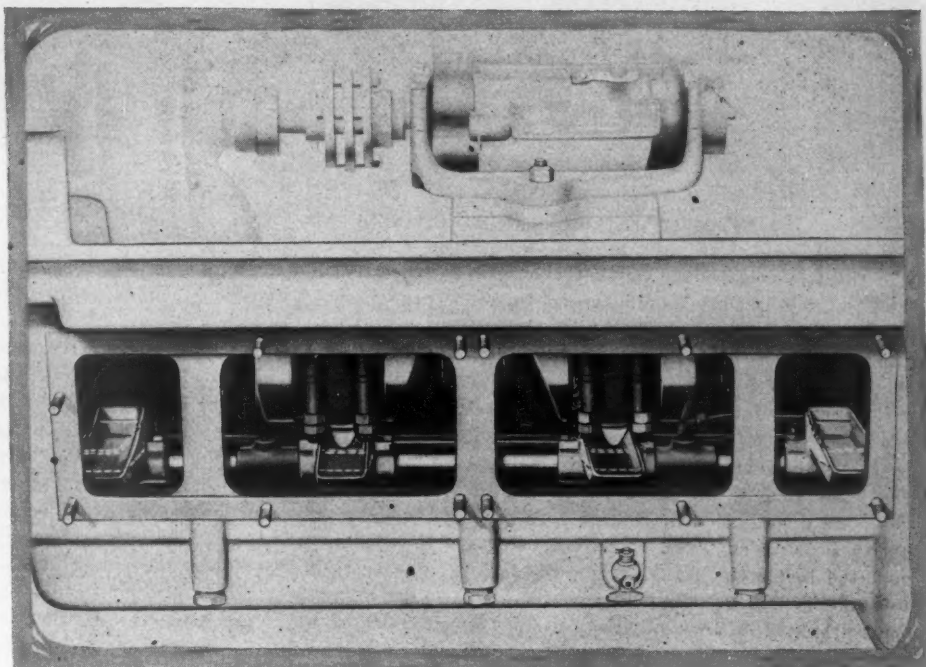
Shows No Change for Coming Season

Refinements in Body Details Chief Features for the 1913 Cars

had designed them, but in addition an auxiliary oiling device connected to the throttle was adopted. This device consists of a small oil tank located on the dash on the back and under the hood. When the motor has reached excessively high speeds or the load has become very heavy, this auxiliary lubricator comes into play, feeding through the intake ports. In the early sleeve-valve motor, a sort of auxiliary oiler, feeding through the cylinder heads, was used. This, however, gave more or less trouble, and had a tendency to smoke. It is claimed for the Stearns system that it entirely eliminates this trouble.

The principle of operation and details of this now famous motor has been exhaustively treated in Motor Age within the past year; however, for the benefit of those who are not familiar with the motor, the general features of the Knight construction will be reviewed. The illustrations herewith will help to bring out the constructional details. Primarily, there are two concentric sleeves which fit within the cylinder, between it and the piston. These sleeves move up and down, being actuated by small connecting links which are connected to an eccentric shaft.

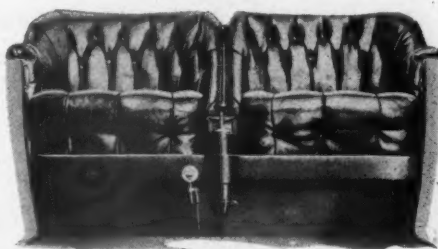
Slots cut near the top of the sleeve serve as port openings, admitting or exhausting the gas at the proper time. When the exhaust or inlet openings in the two concentric sleeves register with one another and with the opening in the cylinder wall, there is a path from within the cylinder into the exhaust or inlet manifold, as the case may be. Of course, as soon as the three



STEARNS-KNIGHT OILING ARRANGEMENT

Showing oil troughs the level of which is automatically varied with engine speed

openings begin to register, there is a partial passage between manifold and cylinder, but the port is not fully open to the gases until all three openings—the two sleeve slots and the cylinder passage—are in exact register.

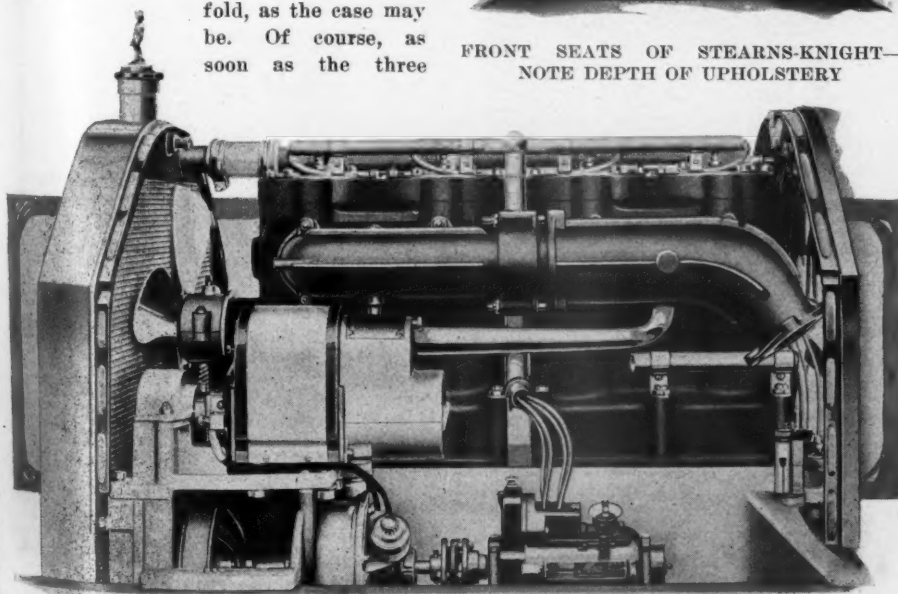


FRONT SEATS OF STEARNS-KNIGHT—
NOTE DEPTH OF UPHOLSTERY

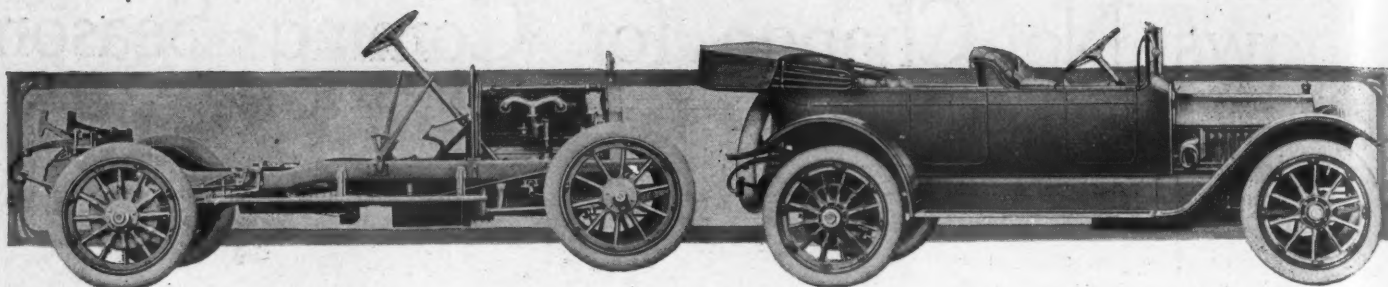
In its motion up or down the opening or slot in one of the sleeves may be opposite the cylinder opening, but no gas can escape or enter because the passage is barred by the other sleeve. The movement of the sleeves is so timed that only during the exhaust stroke or the suction stroke do the two sleeve ports come close together and at the same time come opposite the opening in the cylinder wall.

Since the sleeve movement is small, the problem of oiling is not a troublesome one. In fact, the stroke of the sleeves is only about 1-10 that of the piston. That is, while the piston stroke is 5½ inches, the stroke of either sleeve is only 1½ inch. For a crankshaft speed of 1,500 revolutions, which means a piston speed of 1,375 feet per minute for a 5½-inch stroke, the sleeve speed is approximately 140.5 feet per minute, nearly a tenth, as already stated. The Knight motor does not use gears to drive its eccentric shaft, which through the small connecting rods imparts the sliding motion to the sleeves. This shaft is driven by silent chains, as shown in the illustration. A silent chain also connects the crankshaft with the magneto shaft. The latter in turn drives the electric generator shaft through another silent chain.

The oiling system of the Stearns-Knight has been briefly touched upon, but special attention should be drawn to the varying-level oil troughs, one of which is under each of the connecting rod ends. Scoops on these rod ends dip into the oil contained in the troughs and splash it onto the sleeves, bearings, etc. The troughs are connected to the throttle. Opening



MAGNETO SIDE OF STEARNS-KNIGHT MOTOR, SHOWING LIGHTING GENERATOR



THE 1913 STEARNS-KNIGHT CHASSIS

NEW SERIES STEARNS-KNIGHT FIVE-PASSENGER TOURING CAR

the throttle raises them so that they will hold more oil, thus feeding more to the bearings, while closing the throttle lowers the troughs so that less oil is available. A gear pump furnishes oil to the troughs by means of four oil leads. Another oil lead goes to the fan, while a sixth passes to the dash sight feed. It will be noticed that the sleeves are grooved to aid in the even distribution of the oil over their entire bearing surfaces. The magneto is mounted below the generator on the right side of the motor. The former is a Mea type, its lack of noise recommending it particularly. The generator furnishes light for all lamps, but not for starting. The American Ever-Ready spring starter is used. This device is placed at the front of the motor, and consists of a coiled spring of sufficient strength to turn the crankshaft a number of times when released. After the engine is running, the spring is rewound automatically. The generator is a Vesta. A Stromberg carbureter is used.

It may be said that the Stearns chassis has been designed to meet the peculiar power output of the Knight motor. The gear box is placed at the rear axle, bolting to the differential housing. The clutch is of multiple-disk type, having fabric facings on the plates where they engage with one another. The clutch is located within the flywheel. From this point the power is transmitted through a universal joint, and thence to the propeller shaft, which is inclosed within a substantial torque tube. This latter is hinged in the conventional way at either side of the shaft to a cross member of the frame by means of two arms, which form a U-shaped construction. At its rear end the torsion tube bolts directly to the gearset housing.

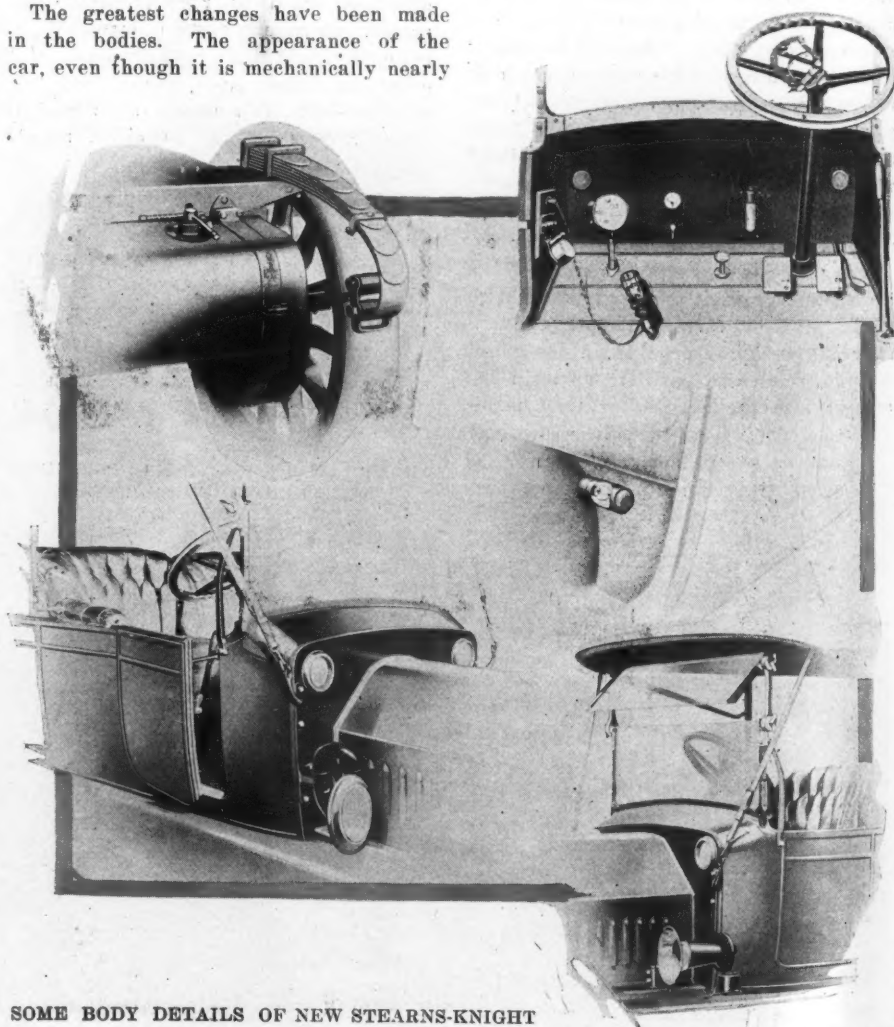
Radius rods maintain the correct alignment of the live rear axle. The gearset provides three speeds forward. It is of the selective type, the gear shifting being effected through the use of an H-gate. Three-quarter elliptic springs are used in the rear being shackled outside the frame. The front springs are half-elliptic. The frame is dropped at about the middle, and raised at the rear so as to clear the rear axle. The gasoline tank is carried in the rear, the fuel being fed to the carbureter under pressure of about 2 pounds. Brakes are internal expanding, two for each drum. One drum is placed within the

other concentrically, the same type of cam-operated expanding shoes being used for both.

Right drive and right control have been retained. It is not known yet as to whether the drive and control of the new six will be right or left. That remains to be seen. A slight change has been made in the steering mechanism, the steering gear case now extending from below the frame to the floor boards, giving greater rigidity of the entire steering column. Another minor change which is worthy of note is the placing of all wiring for the electric lighting system on the body. This wiring was formerly run along the frame, but it has been removed from the chassis so as to eliminate any danger of short-circuiting.

The greatest changes have been made in the bodies. The appearance of the car, even though it is mechanically nearly

a counterpart of its predecessor, is different. The straight-line flush-sided body is now used, the door hinges being concealed. The running boards have been cleared of tool boxes, battery boxes, tires, and so on, giving a clean-looking appearance. Upholstery has been made thicker and deeper than last year, and the equipment is much more complete. The most important items which come under the latter head are the self-starter, silk mohair top, windshield, Warner Auto-meter, Klaxon horn, electric generator for lighting all lamps, demountable rims, robe-rail, foot-rest, tire carriers, and so on. The cars are finished in nickel plate and black enamel. A part of the electric equipment is a plug for extension trouble lamp.



SOME BODY DETAILS OF NEW STEARNS-KNIGHT

Gasoline tank shutoff; arrangement of fixtures under the dash cowl showing trouble lamp; bulls-eye dash portlamps and means of ventilating front compartment; location of electric horn



CAT
DOG
MOTOR
PLUG

The Motorist's Kindergarden



EDITOR'S NOTE—It is the intention of Motor Age to publish in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a thorough and simple elucidation of motor car principles.

OF the motor cars one sees on the streets there are three kinds: gasoline, electric, and steam, referring to their motive power. The last named can be dismissed with a few words, for steam cars are becoming fewer and fewer each year. Early in the history of the motor car industry, the steam car was the most popular, owing to the lack of development of the two other kinds. There are many people today who prefer the steam car on account of its smoothness of running and ability to climb hills. The steam car works on the same principle as the railway locomotive, generating steam in a boiler to operate a steam engine. Gasoline is the fuel generally used for the fire under the boiler. Most people feel that to drive and care for a steam car one must be something of an engineer. In fact the chief difference between the steam car and the gasoline car has been expressed aptly by a motorist, who had driven both types, in the statement that when something went wrong with the gasoline car it took a day to find the trouble and a minute to fix it, while with the steam car, it took a minute to find the trouble but it took a week to remedy it.

Electric cars are driven by one or two electric motors which receive current for their operation from an electric storage battery carried in the car. They have a distinct field and in that field are very popular. They do not have to be cranked, are silent, smooth and reliable. The chief features urged against them are that they are heavy and the fact that the storage batteries must be recharged with electric energy about every 100 miles necessitates that they get not too far away from a charging station.

Dismissing these two classes of cars with this, we will turn to the gasoline type of car, by far the most widely used type, and the one which will receive the greatest part of our attention. To make clear from the beginning the order in which the gasoline motor car is to be explained, it is necessary first to look at the car as a whole. It is made up of two main parts, entirely distinct from one another, the body and the chassis.

The body of a motor car is simply the result of the carriage builder's art and need not concern us at this time. The chassis is what is left of the car when we loosen up the bolts that hold the body to the frame and take off the body and fenders. The chassis is the real works of the car. It consists, first of the engine,

The Car as a Whole

or motor, located in front of the dashboard, performing the same duties and occupying about the same relative location as the horse does in the older type of road vehicle. Next, there is the transmission, which term includes all the machinery that helps in making the power of the motor turn the driving wheels. The term transmission is often used incorrectly to mean the gearset, which is only a part of the transmission system as will be explained later.

This system includes the clutch, which is next to the motor, then comes a short shaft to the gearset. From the gearset extends a shaft called the driving shaft, or propeller shaft, to the rear axle, in shaft-driven cars. In chain-driven cars, the driving shaft extends only part way to the rear axle, but connects with a cross shaft from which chains run to either the rear axle or the rear wheels. The final part of the transmission system is the rear axle with its differential. At one or both ends of the propeller shaft and often in front of the gearset are placed universal joints, sometimes called cardan joints or Hooke's joints. These allow the shafts to rock or hinge about in any direction while

the shafts are rotating. The swaying of the car on its spring makes this flexible connection necessary.

The third system of the car is the running gear. This includes the wheels, front axle, springs, the frame which carries the motor and transmission system, and the steering and control arrangements.

In addition to these systems are the various adjuncts which are necessary to their proper operation. In the case of the motor, these include the fuel and oil tanks, the ignition devices, muffler, etc. The transmission system is very nearly complete in itself and the running gear adjuncts include such parts as the mud pan under the motor, the hangers for the mud guards and steps and so on.

In the following numbers the different parts that compose each of these systems of the chassis will be taken up in their relation to one another, and their uses explained. Afterwards, it will be shown how each is made to perform its work as a part of the complete car and how it is constructed so as to do its allotted work in the best way. In Fig. 1 is illustrated the chassis of a modern motor car, the shaded parts indicating the usual location and general appearance of the motor and transmission system, the actual works of the car.

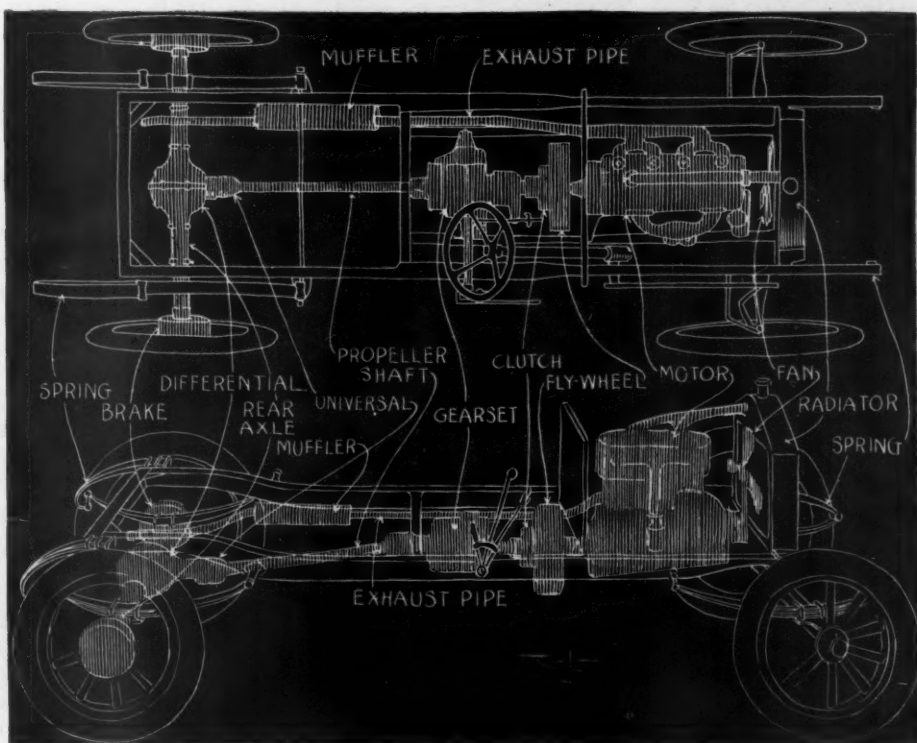


FIG. 1—CHASSIS OF MODERN CAR SHOWING MOTOR AND TRANSMISSION



GROUP OF FORD OWNERS AT STOCK SHOW AT HOOPER, NEB.

MINNESOTA'S Tag Receipts—For the fiscal year ending July 31 the secretary of state of Minnesota reports receipts of \$60,168 from license fees for motor cars and from chauffeurs. The previous year the total was \$30,385.

Indiana Registrations—During the 3 months ending September 30 the number of motor registrations in Indiana was 5,222, according to a report made by Lew W. Ellingham, secretary of state. During the same period of 1911, the number of registrations was 3,467, showing a gain of 1,755.

Crayfish Blamed—Complaint is being made by motorists who are using the highway between New Orleans and Baton Rouge that crayfish are making holes in the levees with the results that the road, which is built along the levee base, is continually in bad shape.

Enos Gets A. A. A. Job—At an executive meeting of the American Automobile Association at Atlantic City, Laurens Enos, former president of the Automobile Club of Buffalo, was unanimously chosen to succeed the late Colonel Frank M. Joyce of Minneapolis in capacity of first vice-president of the national motor organization.

Beloiters Attend Races—Two hundred Beloit boosters drove to Milwaukee on October 2 in forty cars to spread the gospel of Beloit products and good roads along a 70-mile trail to the Wisconsin metropolis. It was the intention to make the return trip on October 3 by way of a route through Racine, Kenosha and Lake Geneva, but bad roads induced the entire party to remain in Milwaukee all day Wednesday to witness the Vanderbilt cup race. Every male member of the tour was garbed in a linen duster on the back of which was stenciled "Beloit—Ask Me." Souvenirs and pamphlets on Beloit industries, which

include the Warner Instrument Co., manufacturing the Auto-Meter, were distributed. Charles P. Warner acted as pilot and pacemaker for the tour, which it is intended to repeat at least twice during 1913.

Rambler Wins a Cup—The silver cup awarded to the car that runs the smoothest on the high gear at the annual Wakefield-Reading fair in Massachusetts each year was captured this year by Harold A. Upton of Reading with a Rambler Cross-Country car that had been driven 4,700 miles.

New Fields of Motor Bus Service—The Uruguayan government has recently installed four motor buses in Montevideo, one French, two English and one German make. They are to traverse a route parallel with that of the English tram lines. Twenty more are to be added soon, and it is hoped that ultimately 150 will be numbered in the service. The fares will be less than those on the tram lines. A motor bus service is now operated, and has been maintained for at least three years in the Malay peninsula, for passengers, mail and parcels, and while it has never paid its way it has done much toward opening up sections remote from the railway as no other method could.

City Planning Big Garage—Indianapolis, within a short time, expects to have one of the finest municipal garages in the country. A conference of city officials was held last week, and as a result, City Controller Harry R. Wallace consented to recommend to the city council a bond issue of \$110,000. Of the amount that will be received from the sale of the bonds, \$40,000 will be used in erecting a municipal garage. This will be placed in the charge of experienced mechanics, and oil, gasoline and supplies will be bought in large quantities. The fire headquarters,

which will cost \$70,000, will be equipped with motor apparatus, including a squad wagon, combination hose and chemical, ladder truck, chief's machine and a machine for the fire alarm telegraph system. There will be no provision in the building for horses.

Lowell to Have Fire Trucks—At the last meeting of the Lowell, Mass., city council an order was passed appropriating \$16,000 for the purchase of three motor chemical engines and hose wagons for the fire department to add to the motor equipment. The city owns several motor vehicles used for municipal purposes.

Glidden Will Tour Anyway—Although the American Automobile Association has called off the national tour from Detroit to New Orleans, Charles J. Glidden will lead a caravan of tourists over the identical route that was adopted for the national reliability contest. The tour will be conducted under the auspices of the 50,000-Mile Maxwell Club. The run will be open to all. Mr. Glidden will personally drive a Maxwell 40 touring car. He will start from Detroit on October 14 and carry out the schedule as arranged by the A. A. A., arriving in New Orleans on October 27.

Springfield Club Elects—The annual meeting of the Springfield Automobile Club was held last week and the secretary reported that the Massachusetts organization was in a flourishing condition. He stated that eighty-seven members had been added to the club's roll during the year, making the membership now 345. The treasurer's report showed that there was \$3,000 in the treasury to meet any exceptional contingency and in addition there was a balance of \$1,300. The election of officers resulted as follows: F. J. Hillman, president; F. E. Ward, vice-president; W. L. Bunker, secretary and treas-

urer; A. E. Lerche, L. J. Spear, T. B. Gilbert, C. A. L. Wright, G. F. Reed, H. L. Sprague, E. F. Stearns, W. J. Hyland, H. Cave, F. W. S. King, H. E. Corey, F. W. Gumble and E. F. Davis, board of directors.

New Use for Car—L. L. Harmon, a stockman of the Camp Wood country, Arizona, has found a new use for his car. He is using the machine to haul cattle out of bogs. Frequently cattle mire down in the streams of that region and Harmon has saved the lives of a number with his high-powered car.

Columbus Says Universal Lights—The city council of Columbus, O., has adopted an ordinance to compel every vehicle that traverses the streets of the city after nightfall to carry a light. Only one kind of vehicle is excepted and that is a baby carriage. The ordinance becomes effective within 60 days of its passage.

Favors T. C. A. Regulations—The Louisiana Motor Club has memorialized the state legislature advocating the adoption of uniform laws regulating motor cars. It is asked that the regulations drawn by the Touring Club of America, already adopted by a number of states, be embodied in the statutes of the state.

Duluth Starts After Roads—The Duluth Automobile Club has started a roads campaign. It is laying out a new Twin City-Duluth road, which is to reach from Sandstone, Minn., the half-way point, through Superior, instead of direct to Duluth. The club has seventy-five members and plans to double the list before November 1. The Minnesota State Automobile Association has reached the 3,000 mark and is growing. The additional membership in the Duluth club will be the first increase for the fall.

Hoosiers Pick Directors—Directors of the Hoosier Motor Club, Indianapolis, were elected on October 1 and within a few days will elect officers for the ensuing year. There was a lively pre-election campaign between the progressive and regular tickets, the progressives electing seven out of nine directors. The new directors are: One year, C. F. Zwick, Fred E. Wilson and J. M. Ward, Jr.; 2 years, William Esterly, Dr. A. C. Kimberlin and Joseph Raub; and 3 years, J. L. Gavin, George A. Weidley and Fred I. Willis.

Race with Bull Moose—Miss Rose Smith, of Amherst, N. S., is able to tell of an exciting race between her father's car and a big bull moose a few evenings ago. The car was on the way to Halifax and was near Bass river when the moose was approached leisurely trotting along the highway. As soon as the moose saw the motor car he flung back his great spread of antlers and, giving a loud snort of defiance, sprang into the race straight along the road. Although the moose was running fast, the car steadily gained upon him, and for over 4 miles the race was

kept up. Finally, the moose jumped to one side of the highway and in doing so gave a farewell by kicking the glass out of one lamp and bending the mud guard.

Ohio Road Progress—The Ohio state highway commission has made a report showing the progress made in the improvement of the highways of the state up to date. During the year road construction has been accomplished to the extent of \$1,122,060.97. The total length is 658,046.4 lineal feet. There were five kinds of construction used, viz.: brick, concrete, bituminous macadam, water-bound macadam and gravel. The state paid half of the cost of construction on these roads.

Motorphobia Apparent—With the extension of good roads into rural districts of Louisiana where motor cars never have been seen before there is some opposition to them being manifested by the ignorant classes. Obstructions have been placed on the roads and glass scattered. This is particularly true of the Marion road in Union parish. This road is in splendid condition and there has been much motoring over it since it was completed. The loss of a few chickens and a dog is said to have been the cause for the hostility of the natives to motor cars.

Makes It Easier for Cops—In the French quarter in New Orleans, laid out nearly 200 years ago, there has been great difficulty in handling the traffic, owing to the narrowness of the streets. In the last report of the chief of police, he states that, due to the increased number of motor vehicles, it is now possible to reduce the traffic squad materially in the old part of the city. When horses were used altogether, the lives of pedestrians often were endangered by the animals becoming unruly in the jam at street intersections. Motor vehicles have so changed conditions that less than half the number of policemen formerly used on the traffic squad in this section now are employed.

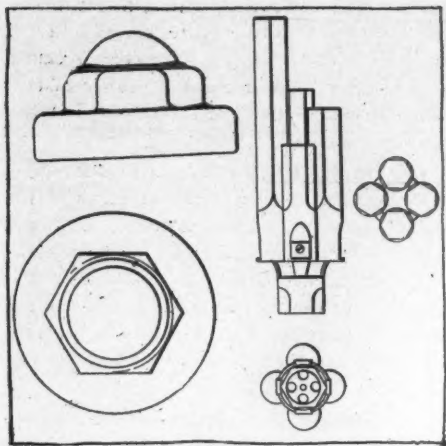
As the Railroads See It—Reference to the motor cars and the way it cuts into the earnings of railways is contained in the statement by President Howard Elliott of St. Paul, president of the Northern Pacific Railway Co., in the company's annual report issued last week. Says Mr. Elliott: "There is little doubt also but that the growing use of the motor car has had its effect on the volume of the passenger business. The latest figures for registration of motor cars shows that there are, not counting commercial vehicles, 827,824 in the United States, or about one for every 115 people, and in the states served by your company, one motor car for about every ninety people. This results in considerable decrease in the short travel on the railroad, and also has had the effect of reducing the volume of pleasure travel, temporarily at least, because people of moderate means cannot own cars and also make trips to the mountains, parks and

lakes. The same causes that affected passenger earnings caused reductions in express and other sources of revenue classified in the income account under 'Other revenue from transportation' and 'Outside operation.'"

Car Stretches Wire—Elmer Sherman, district superintendent of construction of the Coast Counties Gas and Electric Co., found a new way of using his Regal car, in the capacity of wire-stretcher. The wire was fastened to the rear axle of his car and the work was accomplished in 2 hours, that would have taken 2 days to finish by any other means.

Real Estate Men Complain—Real estate men in Montgomery, Ala., are blaming the motor cars for the alarming decrease in the sales of city property. They say that young men who a few years ago invested their surplus money in properties now are buying cars. The homestead companies are suffering severely for this reason, it is claimed. It also is claimed that men of means who formerly made many investments in real estate now are spending all their spare time touring and there no longer is any inclination to spend the time it takes to keep familiar with the local real estate market.

Curious Situation in the East—The next session of the Maine legislature will be called upon to act upon two motor problems that represent the two extremes, and it will be interesting to watch the outcome. Some of the residents of Bar Harbor, having become tired of the loss of business due to the absence of tourists who are not allowed to motor on the island, plan to put in a petition to revoke the law passed especially to exclude motor cars from that place. On the other hand some of the inhabitants of Dark Harbor and Islesboro, another island on the coast within a few miles of Bar Harbor, have instructed their selectmen to get busy and put in a petition for a special law that will give them the privilege of excluding motor cars from their domains as a result of a few motors trespassing upon their little kingdom. At both places there are many summer homes owned by wealthy residents from other states, many of whom own cars, and some of them would like to use their machines at their homes there. Another curious situation exists at Nantucket, a little island off the Massachusetts coast which is protected from motor invasion by a specially enacted state law from motor cars being used there. The selectmen have purchased a motor fire engine and some of the residents favoring motor cars have threatened to have the law enforced if the firemen use the machine, for there is no exemption in the statute for any kind of a vehicle. Meanwhile the fire wagon must remain idle until the legislature meets next year and passes an exemption clause unless the firemen take a chance and rely upon the judge of the court to give them immunity.



THOMAS HUB-CUP DESIGN AND AERMORE HORN

COMBINED Flywheel and Planetary Gearset—To Charles M. Leech, Lima, O. Filed August 25, 1911, dated October 1, 1912. Condensed into proportions little greater than the usual flywheel and clutch unit, this change-gear and flywheel consists of a planetary gearset, the friction members of which are in the form of clutches instead of the usual band brakes. The assembly consists of a driving cup and a main clutch cone, adapted to engage therewith, the driving cone being internally toothed on its greatest inside diameter, these teeth meshing with the teeth of a planetary gear train, comprising a set of gear pinions secured on stub shafts to a revolving casing, and having a corresponding train of long pinions of smaller diameter than themselves secured integral to them.

These long pinions engage a toothed portion of the main clutch cone. This member is integral with the driven shaft, which is slidably mounted at its forward end in the hub of the driving cup. Meshing with the large diameter or primary gear train, on its interior portion is a gear pinion, the toothed portion of which is secured to its hub through a ratchet. An extension of the hub is formed into a bevel cup, adapted to receive a corresponding clutch cone. This cone is keyed or splined to a stationary bearing, in which the driven shaft turns. Integral with it is a disk clutch member adapted to engage a faced disk clutch member which forms the rear portion of the revolving case, upon which the annular gears are mounted. The clutch members are fitted with springs to hold them in engagement and collars and yokes for control.

Engagement of the main clutch gives direct drive. Engagement of the secondary cone clutch locks the internal spur gear, and the planetary pinions and their cage travels at a reduction, with the driving cup, turning the main clutch cone at a still greater reduction in the same direction. Engagement of the clutch disk at the rear, locks the casing, and the main clutch cone is driven at a reduction in the

reverse direction from that of the rotation of the driving cup. The device is dynamically feasible, although some critics doubt whether, if kept dry enough for the proper adhesion of the clutches, the gears would receive sufficient lubrication.

Apple Magnetic Generator Clutch—No. 1,039,685—To Vincent G. Apple, Dayton, O. Filed December 26, 1911, dated October 1, 1912. In connection with a lighting and charging generator, for the purpose of automatically connecting and disconnecting it with the driving means, this clutch consists of two concentric clutch rings, the first secured to the driving means, and the second to the driven armature shaft. These two members are provided with means to produce a magnetic field, appropriate to produce a magnetic drag upon a series of rolling wedges, interposed between the two rings and normally held out of contact with them by springs, but engaging them one to the other in response to the strength of the magnetic flux induced by the relative speed of the driving member. The effect is so adjusted that this moment occurs just as the driving means has attained sufficient speed to cause the dynamo to generate sufficient current to overcome the resistance of the storage battery, and to disengage when the speed falls below this limit of safety.

Primary Dry Cell—No. 1,039,949—To Carl and Bertha Jaeger, Los Angeles, Cal. Filed March 6, 1912, dated October 1, 1912. Similar to the usual form of american dry cell, this design differs in that the carbon element is provided with longitudinal passageways, intersected by lateral passageways, which open at the surface of the carbon electrode. The whole is contained in a zinc can and sealed in the usual manner. At the top of the whole, directly under the sealing layer is a chamber which communicates with the passages in the carbon element. The effect of this construction is to increase the area of contact of the electrolyte and the carbon, producing greater amperage, although at the expense of life.

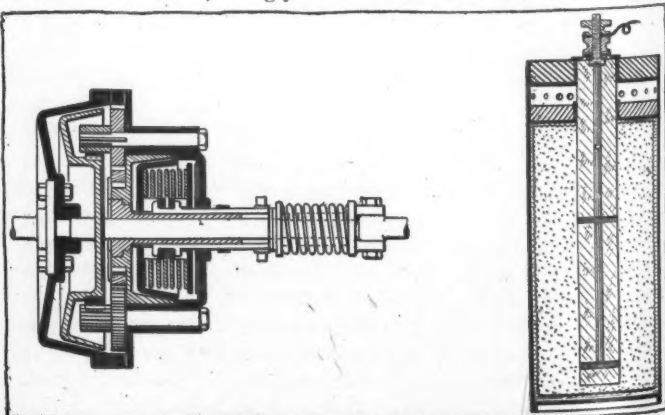
Pneumatic-Cushioned Wheel—No. 1,040,114—To Irwin H. Babcock, De Ruyter, N. Y., assignor of one-half to Lyman H. Coon, De Ruyter, N. Y. Filed September 21, 1911, dated October 1, 1912. This invention seems to overcome the chief objections that have

been raised against pneumatic hubs and mechanical tires. This wheel, while the pneumatic element surrounds the hub, is not of the floating hub type, as it is encased between rigid steel side-plates. The tire is mechanical, but is not rigid, absorbing road obstructions instead of bouncing over them. The tire of the wheel is a pliable strip of tread material, held in place by a set of plungers, one for each spoke, which reciprocate within the hollow spokes of the wheel, bearing at their inner ends upon the pneumatic cushion. The action is therefore similar to a pneumatic tire, except that the impressions are transmitted from the tread to the air envelope through the plungers instead of direct, and the air volume is not so great.

Motor Car Body and Seats—No. 1,039,780—To Franklyn J. Morgan, Chicago. Filed June 26, 1911, dated October 1, 1912. This body is of the three-abreast roadster type, but differs from the usual designs of this type in that the center seat is farther back than the other two, thus permitting the outside seats to be closer together than where the seats are truly abreast.

Design of Aermore Horn—No. 43,081—To Gulian V. P. Lansing, Chicago, Ill., assignor to Aermore Mfg. Co., Chicago. Filed July 29, 1912, dated October 1, 1912. This design was occasioned by the fact that horns of this make are usually applied to the rear of the motor car, in a more or less conspicuous position, and is for the purpose of making them more ornamental than when the pipes are round. In this design they are of hexagonal shape.

Automatic Speed Control for Motor Vehicles—No. 1,040,189—To Henry F. Grubb, Lorain, O. Filed August 8, 1910, dated October 3, 1912. To automatically control the spark and throttle of an internal combustion motor car engine, this device consists of a revolving-ball governor, which is controlled from the steering wheel, to open or close the throttle below or above, respectively, a certain speed. Correspondingly it advances and retards the spark.



LEECH GEARSET AND JAEGER DRY BATTERY

An additional control for the purpose of reversing the action of the governor on the spark mechanism in reference to its action on the throttle is provided.

Design for Hub Caps—No. 43,085—To John L. Sugden, Buffalo, N. Y., assignor to E. R. Thomas Motor Car Co., Buffalo, N. Y. Filed August 18, 1911, dated October 1, 1912. The hexagonal faces of this hub cap are for the purpose of giving a wrench a purchase for removal, and are more ornamental than where their use is disguised beneath meaningless and dust-catching decoration.

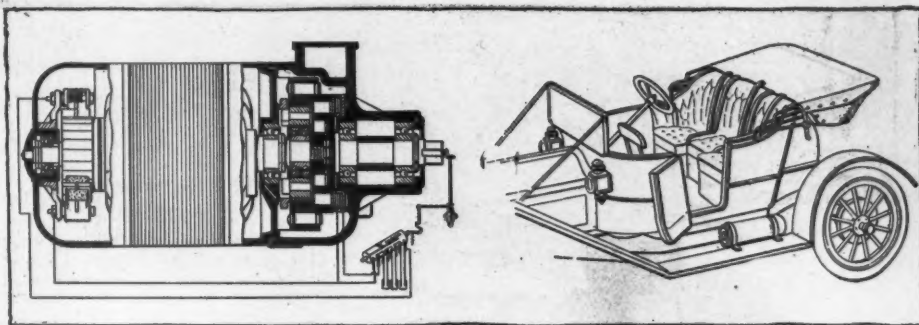


Power and the Plow

A NEW order of things is coming into being in the matter of farm powers. Horses have been bred and developed to their utmost, but the farmer is still dissatisfied. Horse-feed is scarce and dear, and farm help more so. Out in Jim Hill's great northwest, farming under modern methods, is being conducted on such a stupendous scale that the finest products of the horse-breeders' art are relegated to the discard in as far as the bulk of the tilling of the toil and harvesting of its products on the great farms of the northwest is concerned.

Farmers demand more efficient machinery. This because farm help is scarce and becoming scarcer. To enable farmers to do their work short-handed, manufacturers of farm appliances have developed plows which cut more furrows at a passage, mowers that cut a wider swath, harvesters that bind more grain per day, and machinery that can cut, pick, and husk the golden harvest of corn at one operation. This enables one man to do the work of many, and in less time; furthermore increases the demands upon the man, raising in consequence the quality of farm labor, enabling the farmer to offer better wages as inducements to employees. But all of this increased the demands upon the horse, to such an extent that the manufacturers were forced to temporarily call a halt on the development of these devices. The size of the improved implements of farm efficiency, had to be limited to the capabilities of the horse, which limit was below the capacity made requisite by the conditions of the farm labor market. Increased land values also contributed their silent protest against the inefficiency of the faithful draught-animal. The power tractor is therefore coming into recognition as the only solution of this difficulty.

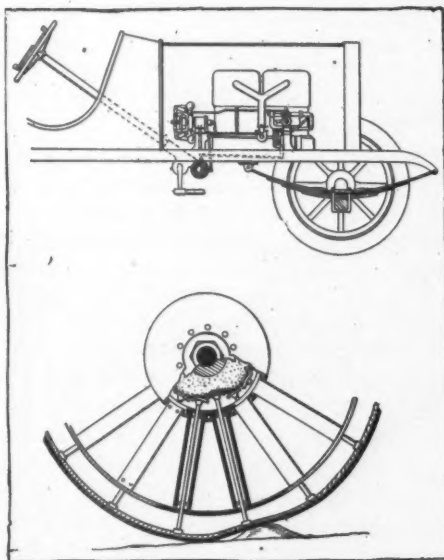
L. W. Ellis and Edward A. Rumley, authorities not only on agricultural machinery and tractors, but on scientific



APPLE DRIVE CLUTCH AND MORGAN BODY

agriculture as well, have discussed this great question in a very complete and interesting volume, "Power and the Plow," published by Doubleday, Page & Co., New York. Commencing with an account of the annual Winnipeg plowing contest as an introduction to the field, a real surprise is in store for most readers in the advances already made. The history of the plow and its problems is next discussed, from the first crooked stick to the modern steam and gasoline gang-plow. The measurement of power is next discussed, animal and mechanical power are compared, each type being thoroughly analysed, and the history of power plowing. The different types of gasoline and steam tractors are next discussed, and their uses distinguished, and ways and means of utilizing them to the best advantage are treated.

The book reads like a romance, and in



GRUBB CONTROLLER AND RUYTER WHEEL

turning the last page one is made to feel that it is indeed a romance that has been enacted in the mechanical development of the natural resources of the great northwest. Also that what can be done on a large scale with crude instruments, will eventually be done on a more moderate one with machines of later development. Excellent illustrations, charts, diagrams, and an appendix containing a list of specifications of the leading makes of

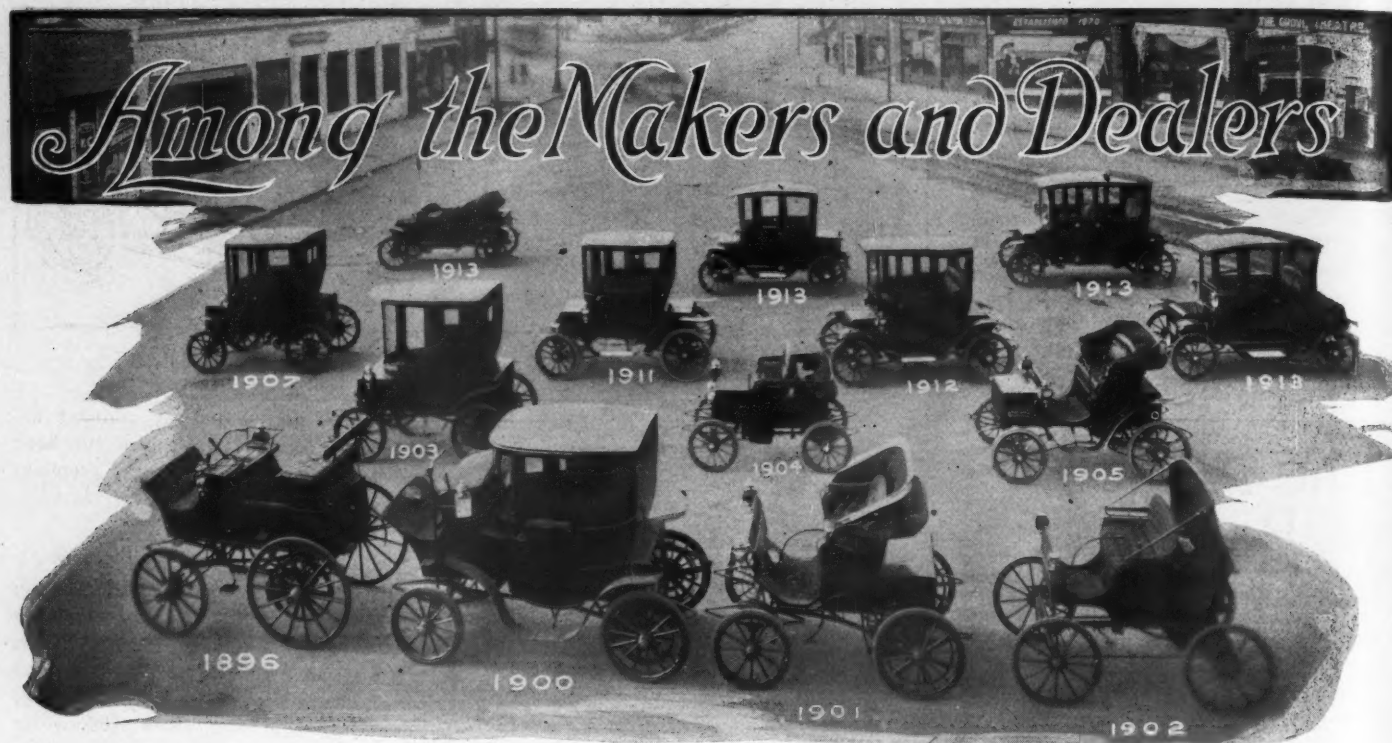
gas tractors, and a list of eminent authorities, append the work, and the book is concluded with an inspiring prophecy on the future of the gasoline tractor.

Pyrometry

Pyrometry, or the measurement of degrees of temperature beyond the boiling point of mercury, is a science that has been very highly developed in recent years, and which has found a wide field in the industries as well as in scientific research, but so much has been done toward its evolution that little attention has been given to the chronicling of the achievements in this field. Charles R. Darling, who is an authority on heat in Great Britain, has undertaken this work supplementary to his former work, "Heat for Engineers."

"Pyrometry" is a treatise on the practical use and application of pyrometers, and is published by Spon & Chamberlain, New York. The discussion is opened with a general exposition of the science, its application, history and the instruments used in it, of which there are no fewer than sixteen forms, with many variations of each form. The measurement of high temperature is a problem involving many difficulties, as there are many temperatures to be measured that exceed the melting point of gold and platinum, and the internal pressures in closed vessels resultant therefrom being greater than the strength of porcelain and glass. Thus the forms wherein closed vessels are used, or where the expansion of solids is relied upon as the registering element, are limited in their scope.

The development of the science of pyrometry was retarded by these apparently insurmountable obstacles, until the thermal properties of electricity were discovered and applied. In the experiments along this line, many wide fields of application for pyrometric apparatus were uncovered, notably in the steel industry, until at the present time, young as this science is, it is one of the most advanced, and has a wide field of uses. The subject is gone into deeply, and yet is treated with a breadth of scope that makes the work comprehensive, intelligible, and interesting. The book contains 196 pages, well illustrated with drawings, tables and diagrams, and sells for \$2 net, in cloth, 5 by 7½ inches.



ELECTRIC CONSTRUCTION FROM 1896 TO 1913

During the recent fall festival of the Chicago Automobile Trade Association the Woods company displayed models of its product since 1896. The illustration is from a photograph taken in front of the Woods' company's Chicago factory

E. B. WILSON Resigns—E. B. Wilson has resigned as general sales manager of the Poss Motor Co.

Death of Dixon Official—William H. Corbin, vice-president of the Joseph Dixon Crucible Co. of Jersey City, N. J., died September 25.

Apperson in New Deal—Elmer Apperson, of the company building the Apperson car, is head of a new concern that has been organized to make the Wilson Never-Miss self-starter, which is of the compressed air type. A new plant will be erected at Kokomo, Ind.

Receiver in Charge—The Dayton Taxicab Co. and the Dayton Auto Delivery Co. went into the hands of a receiver last week at Dayton, O., following the disappearance of George D. Thayer, president of the former concern. Charles Zetler was appointed receiver by the court to take charge of the business. It is claimed that the court action was the result of manipulations on the part of Thayer, who is supposed to be in Pennsylvania. Criminal proceedings are also threatened.

Work of Safety Congress—The safety congress held at Milwaukee from September 30 to October 4 under the auspices of the Association of Iron and Steel Electrical Engineers has resulted in the organization of the National Council for Industrial Safety, which will conduct an American safety congress in 1913 at New York, and an international congress at San Francisco in 1915, in conjunction with the Panama-Pacific exposition. Motor car manufacturers will be invited to join the national council, the importance and magnitude of this and allied industries having

received instant recognition. The excellent progress of safety work in this industry was widely commented upon.

Shanks Made Sales Manager—The Kelly Motor Truck Co. of Springfield, O., announces the appointment of Charles B. Shanks, formerly of the Winton, as sales manager. The Kelly people are reorganizing their company and announce they have ample capital to carry on the manufacture of trucks.

R. C. H.'s 1913 Orders—Contracts for 15,120 R. C. H. cars for delivery during the selling season of 1913 have been closed by the R. C. H. corporation since July 1, it is announced. Nearly one-third of these season's contracts, or 5,009, were closed during the month of September. To hold its market firm the year round, the R. C. H. has built up an export business that will require about 20 per cent of the next year's output.

Vinot Directors Chosen—The following will act as directors of the newly formed Vinot Car Co. of Canada: C. Ernest Gault, M. L. A.; George Fairbanks, J. B. Bailargeon, J. Edward Chapleau and J. A. Michaud. Mr. Michaud probably will be appointed managing director. Plans are under way for the immediate establishment of factories for the manufacture, on a large scale, of Vinot cars in Canada and of tires and carriage bodies. Besides being directors of the Vinot Car Co. of Canada, these will also act as directors of two subsidiary companies to be known as the Canada Fearless Tire Co. of Montreal and the Automobile Carriage Building Co., Ltd. A site already has been selected, in the east end, for the erection of a large fac-

tory and it is expected that it will be possible to turn out the finished product in the spring.

Midland Changes—J. D. Beebe has been appointed general manager of the Midland Motor Co. of Moline, Ill., succeeding Frank B. Wood. F. A. Padgett has been made sales manager. The company will build a 60-horsepower six-cylinder which will be fitted with a Wisconsin motor.

Kenyon Increases Stock—The R. L. Kenyon Co. of Waukesha, Wis., manufacturing tops, seats, cushions, covers and other accessories and materials, has increased its capital stock from \$100,000 to \$200,000. The additional issue will be devoted to the expansion of the business. The company moved to Waukesha from La Crosse about 2 years ago. The officers are: President, R. L. Kenyon; vice-president, G. A. Noetzel; secretary, G. W. Thompson; treasurer, R. P. Breese.

Lower Priced Pope-Hartford—Latest among the makers of high-priced cars to add models to their line that are designed to be within the reach of the man of moderate means, is the Pope Mfg. Co., Hartford, Conn. Upon the completion of a new addition to its plant, a new model of the Pope-Hartford car is to be offered. This car will be of 40 horsepower, with a four-speed roller-bearing gearset, full floating rear axle, double drop, and narrowed frame and three-quarters elliptic rear springs, with a 118-inch wheelbase, 36 by 4½-inch tires on demountable rims, and the Gray & Davis electric lighting and starting system. The other models, of this year, the four-cylinder 50 horsepower, and the six-cylinder

60-horsepower model will be continued for 1913 with minor refinements, and the Gray & Davis electric system.

H. E. Rice Makes Change—H. E. Rice has resigned from the Atwater Kent staff and has associated himself with the Schoen-Jackson Co., which is manufacturing the Peps carbureter at Moylan, Pa.

Krebs Buys Elmore Plant—The Krebs Motor Co., a Clyde, O., concern, has purchased the old plant of the Elmore Auto Co. B. A. Becker is president of the Krebs Co., and Homer Metzgar is secretary.

To Make Tires—The Patterson Rubber Co., a Massachusetts corporation, with a capitalization of \$500,000, has decided to locate at Lowell, Mass., where five buildings will be erected and the company will soon begin the manufacture of motor car tires. About 1,000 employees will be put to work. John S. Patterson of Providence, R. I., has been made president of the new concern.

Pharis Elects Officers—The Pharis Tire and Rubber Co., Columbus, O., recently incorporated, has been organized by the election of A. R. Lindorf president, R. W. Pharis secretary and treasurer, and Carl Pharis general manager. The concern, which took over the plant of the Newark Tire and Rubber Co., Newark, O., recently has decided to keep the plant at that point. Additional machinery will be installed, including grinding apparatus. The capacity of the plant now is fifty tires

daily, which will be doubled in the near future. In addition to making what is known as the Pharis tire the company will make a tire called the Packard.

Pierpont Makes a Change—Robert Pierpont has accepted the position of factory manager of the Wisconsin Motor Mfg. Co. of Milwaukee, Wis., which builds a line of motors for pleasure cars and trucks. Mr. Pierpont is known in the motor field through his association with the Olds Motor Works at Lansing and other General Motors properties.

Smalley Daniels Moves—Smalley Daniels, operating as manufacturers' sales representative, with main office for several years at Boston, has moved his main office to Detroit, and will make Boston a branch instead. His operations outside of Michigan are distinct from the Smalley Daniels Co. of Michigan, which has just succeeded to the Snyder & Harbridge Selling Co., of Detroit.

Rubber and Leather Substitute—A new leather and rubber substitute is mentioned in the daily Consular Reports under date of September 21. Known as Seagumite, it is obtained from seaweed, and it is claimed to be nonflammable, impervious, leather-like, damp-proof, and a germ-proof hygienic composition, unaffected by heat, cold, oils or exposure to the weather. It is said to be adaptable to use as motor car tires at one-third the cost of other materials, and of equal

durability. The experimental stage of this product has been passed and it is now proposed to erect a plant for its manufacture in quantities for the regular market.

Marinette After Engine Plant—The chamber of commerce of Marinette, Wis., has practically closed negotiations with a large manufacturer of motors for pleasure and commercial cars, now located at Chicago, for removal to Marinette. The Chicago concern is given a bonus in the form of a site for a factory and a suitable structure in which manufacturing operations may be carried on for the present, and during the construction of a new plant at Marinette.

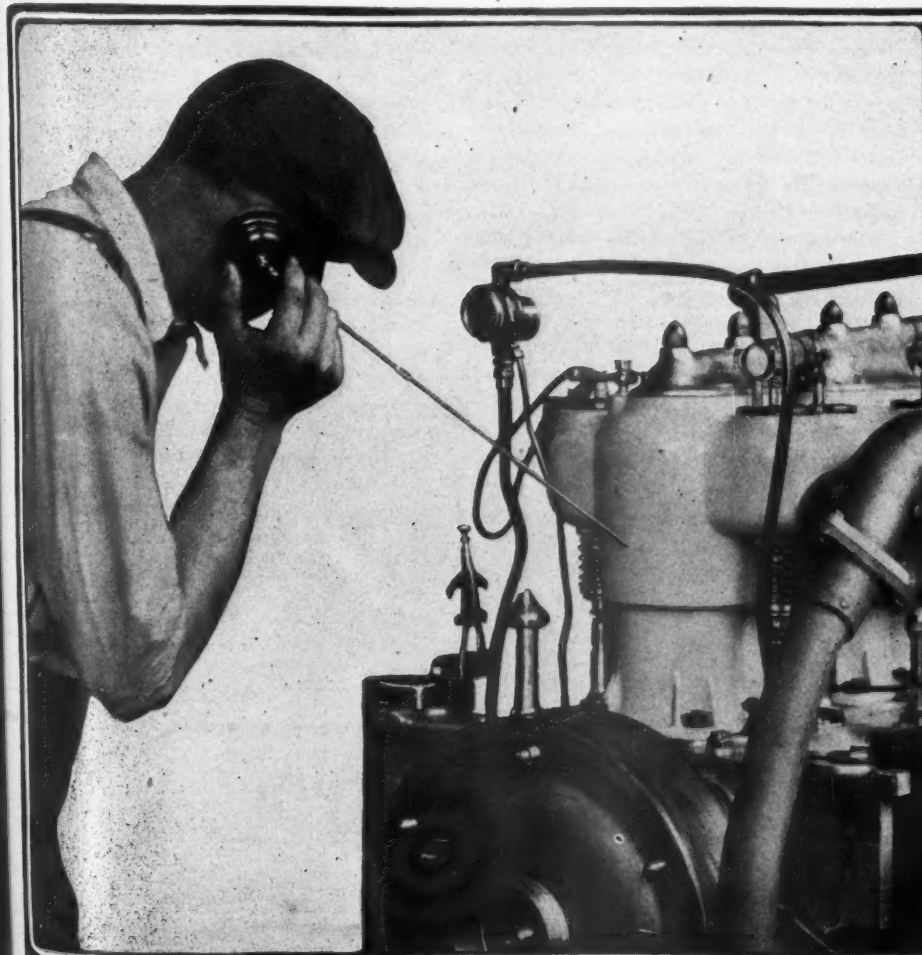
Havers Declares Dividend—The Havers Motor Car Co. of Port Huron, Mich., has just closed its fiscal year, which is the second year it has been engaged in building the Havers six-cylinder car, and has declared a stock dividend of 40 per cent and a cash dividend of 5 per cent. The Havers company is now settled in the plant recently purchased from the E-M-F and the outlook for 1913 is bright, the company having already booked orders for over 600 cars for the coming year. The Havers Motor Car Co. has a capital stock of \$200,000. The officers are: President, A. D. Bennett; vice-president, H. L. Stevens; general manager, Andrew J. Murphy; directors, David McMorran, Samuel L. Boyce, E. R. Harrington and Phillip Higer.

STETHOSCOPE TESTS MOTOR'S HEART BEATS

There is no marked similarity between the physician's office of a life insurance company and the block testing room of a motor car factory, yet they have points in common. Among the tests given in each place is that of the stethoscope. The physician uses it to detect irregularities of the heart, and the mechanic to discover any unevenness of operation in the motor.

While it serves the same purpose as the stethoscope, the instrument used in the high-grade motor car factories is slightly different in appearance. It consists of a steel rod made of three separate pieces combined with a regulation telephone receiver. By placing the end of the rod against the side of a motor it is possible to locate the source of the smallest disturbance. The lightest of "valve slaps" or knocks in the engine are thus noted, allowing the correction of any fault before mounting the motor on a chassis. The road testers carry similar instruments as an extra precaution against the possibility of car being turned over to the sales department with a faulty motor which might result in dissatisfaction among the concern's customers.

The accompanying illustration taken in the Detroit plant of the Lozier Motor Co. shows a workman testing the exterior of a six-cylinder motor for interior trouble.



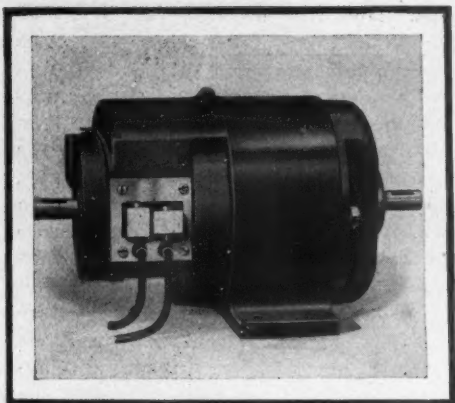


FIG. 1—GENERATOR OF NEW HOLTZER-CABOT SYSTEM

Holtzer-Cabot Lighting Dynamo

FEATURING the manner in which the current is controlled, the Holtzer-Cabot lighting dynamo, manufactured by the Holtzer-Cabot Electric Co., Boston and Chicago, is offered in the form of a direct-current generator with an automatic centrifugal switch, which is its distinctive feature. This dynamo is connected in a simple series storage battery system for lighting and ignition of motor cars.

The dynamo is direct-current, shunt-wound, with a laminated field structure, which carries the field coils, which are in turn held in place by the pole shoes. The armature is large in diameter, $3\frac{1}{2}$ inches, and mounted on ball bearings. The commutator has fifty segments, separated by mica, and is 1 inch wide. The central housing is of laminated soft iron, and is rigidly welded to the base. The armature is wound with cotton insulated wire, enameled with a special composition that renders it impervious to both moisture and heat. The brushes are of copper-carbon, retained by flat accordion pleated springs, which are said to retain the brushes always in the proper position.



FIG. 2—WESTINGHOUSE VULCANIZER

Development Briefs

Description of Holtzer-Cabot Lighting Generator—Westinghouse Produces Electric Vulcanizer—Development of Gasoline Gauge for Pressure System

The automatic switch, which constitutes the governing member of the generator, is in the form of two concentric rings, made of three segments each. The outer ring is rigid, the segments being insulated from one another by means of mica inserts. The inner ring comprises one stationary segment, secured to the outer or collector ring, and two loose segments, normally retained on the collector hub by springs, but upon the dynamo gaining sufficient speed to generate a current, they move outwards by centrifugal force, and make a contact with their corresponding segments on the collector ring. This contact continues until the speed of the generator falls below a safe minimum, when it is broken by the returning of the segments to the collector hub.

The wiring of the system is very simple. Two wires from the generator lead to a connected. The battery is wired to the system by two wires only, in series, thus conserving the life of the battery, and rendering its discharge uniform. Connections are made from the junction box to all five lights by separate circuits, and in addition, leads are provided for an electric horn, a controlling button therefor, and for ignition. These circuits are controlled by four push-buttons, which are used to connect the tail and dash lights, the sidelights the headlights, and to disconnect the dynamo during day driving, respectively.

Any battery of the proper capacity may be used, the Edison B-6 1200 ampere battery being recommended by the manufacturers. The generator is shown in Figs. 1 and 4.

Headlight Glare Eliminator

In many cities, where the front streets are brilliantly lighted, but the majority of the rest of the city is left in darkness, the use of headlights is almost imperative, and yet the danger of headlight glare in passing is so great that many of these cities are passing ordinances against their use within the city limits. The general use of a glare screen, such as shown in Fig. 3, undoubtedly would relieve this condition and result in a modification of the stringent ordinances advocated. This device consists of a disk of fine lawn, bound with tape, in the outer edge of which is inserted a wire spring.

This is claimed to dispel the blinding glare of the naked light, and yet it is said that the light given is but little less effective in illuminating the road, and that it is less intense, being diffused over the road more evenly and natu-

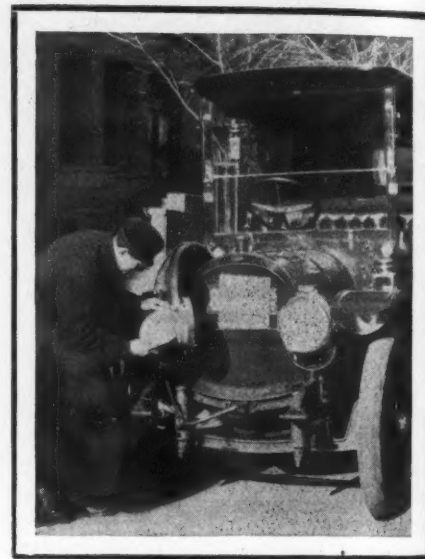


FIG. 3—TOBIAS GLARE SCREENS

rally, and being hence less of a strain on the eyes of the driver. It is further asserted that in a foggy night the diffusion of the rays makes lights so screened more effective than without. They are made in half sizes of from $6\frac{1}{2}$ to 12 inches in diameter by F. H. Tobias, New York.

Westinghouse Electric Vulcanizer

The Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa., has just brought out an electric vulcanizer, Fig. 2, which permits the owner to repair cuts, digouts, etc., in tires in his spare moments, at little cost, and without removing the tire from the wheel, or the wheel from the axle. The vulcanizer is provided with a concave surface for casing repairs, and a flat surface for tubes. The heating element consists of a metal ribbon imbedded in mica, which is hermetically sealed in the metal casing. Being free from contact with the air, the heater is thus saved from oxidation. The temperature is controlled by a rheostat of fifteen steps, secured to the clamp-board, and is read by a thermometer.

The vulcanizer is clamped to the tire by means of attachment straps, and the current is taken from any lighting circuit of from 100 to 125 volts, a standard screw plug being included with a suitable length of cord with the outfit.

Imperial Gasoline Gauge

Gasoline gauges are becoming recognized as a necessity to intelligent, economical and safe motoring. The gauge shown in Fig. 5, which is the product of the Imperial Fluid Gauge Co., Canton, O., is adapted to either gravity

Novelties for Motoring

Warner Gear Works Making Interesting Four-Speed Gearsets — Sensitive Drill Stand for the Duntley Electric Drills Now Brought Out by Its Makers

or pressure feed systems, and may be placed in any position, preferably on the dash, constantly under the driver's eye. The device consists of a glass stand-pipe, graduated in gallons, connected to a feed-line from the tank. In use with pressure feed, a well is disposed beneath the tube, extending below the floor line, in which a cylindrical float is placed. To this float a wire is connected with an indicator head, suitably colored, extending up into the glass tube to show the amount of gasoline in the well. To the top of the tube a compression connection is made to a return air line, so that the amount of gasoline in the well always corresponds with the height of the fluid in the tank. For gravity feed, the well, float and air return are dispensed with, the gasoline standing in the tube to correspond with the height of the fluid in the tank. A vent cap with a float valve to prevent overflow is placed at the top of the tube. All connections are made without solder, the outfit being shipped from the factory assembled according to the specifications of the intended installation. These particulars cover the depth of the gasoline tank, diameter of supply pipe, type of fuel feed, location of tank, its relation in respect to the frame, and its height, top and bottom from the ground, and must be sent with the order.

Warner Transmission

One of the concerns whose business it is to furnish parts, such as gear sets, steering gears, differentials, and so on, to the

motor trade is the Warner Mfg. Co., Toledo, O., makers of the well-known Warner steering gear. Of especial interest in this line is the concern's new pleasure-car gearset particular interest attaching to it because it is of the four forward speed type. The direct drive is on the third speed, and there is one reverse gear combination.

A feature of interest is that the shafts are of very large diameter and unusually short, making the outfit exceedingly compact in design. The gears are all of five pitch, which is rather heavy. They are made of chrome vanadium steel and are of large diameter.

The shafts are all mounted on annular ball bearings, a conventional feature of which has been carefully worked out in the Warner design. There are four supporting arms for attachment to the chassis frame. The overall width of the gearset is 21 inches, while the total length is 20 inches.

In driving on fourth speed with this gearset, the increase in speed over direct drive is about 18 percent. The following table shows the relative speeds of the engine shaft A and the transmission shaft B when the various gears are used. These are all referred to the shaft B, as will be seen from the table.

Speeds.	Revolutions of Shaft A.	Revolutions of Shaft B.
First	3.220	1
Second	1.757	1
Third	1.000	1
Fourth .....	.347	1
Reverse	4.820	1

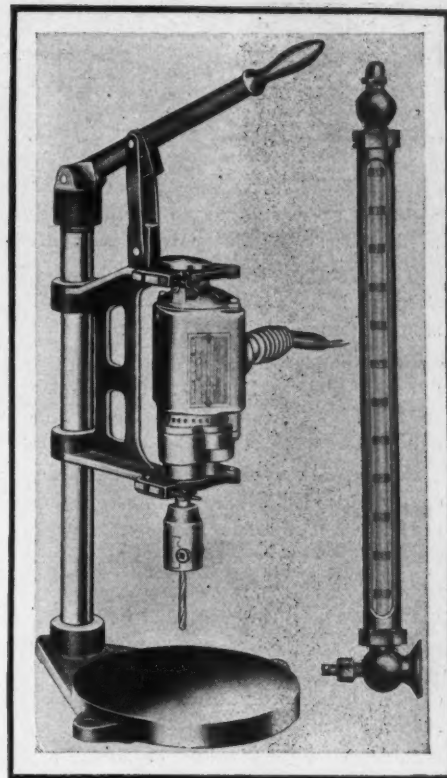


FIG. 5—DUNTLEY DRILL STAND AND IMPERIAL FUEL GAUGE

The outfit is complete with an interlocking device and locking plungers, and while it is standard with side control, the maker will also furnish it for center control, for left-hand control with right side steering or right with left hand steering.

Sensitive Electric Drill Stand

Designed for use with sizes No. 000 and 000X of Duntley portable electric drills, the drill-press stand, Fig. 5, has just been produced by the Chicago Pneumatic Tool Co., Chicago, to fill the demand for a substantial stand for stationary drilling with its portable electric drills. The stand is intended for accurate and rapid drilling, which heretofore has been possible only with the larger and more expensive stationary drill-presses employed generally in the more elaborate equipments.

The new device is very simple in design, consisting of a base, adapted to be screwed to the bench, to which is secured a vertical column, upon which the drill bracket slides. This drill bracket is of one piece, the drill being secured to it by means of two clamping straps. It is raised or lowered by means of a lever pivoted to the top of the pillar, and linked to the bracket. The stand is furnished with or without the drills, which are of 120 volts and 240 volts for holes under 3/16 and 1/4, respectively, or may be purchased alone, for those who have drills already. Either of the drills may be attached or taken out of the stand in a few seconds, and require no special attachments to adapt it to use in the sensitive stand. This new arrangement gives the portable electric drill a new field of usefulness in the motor car repairshop.

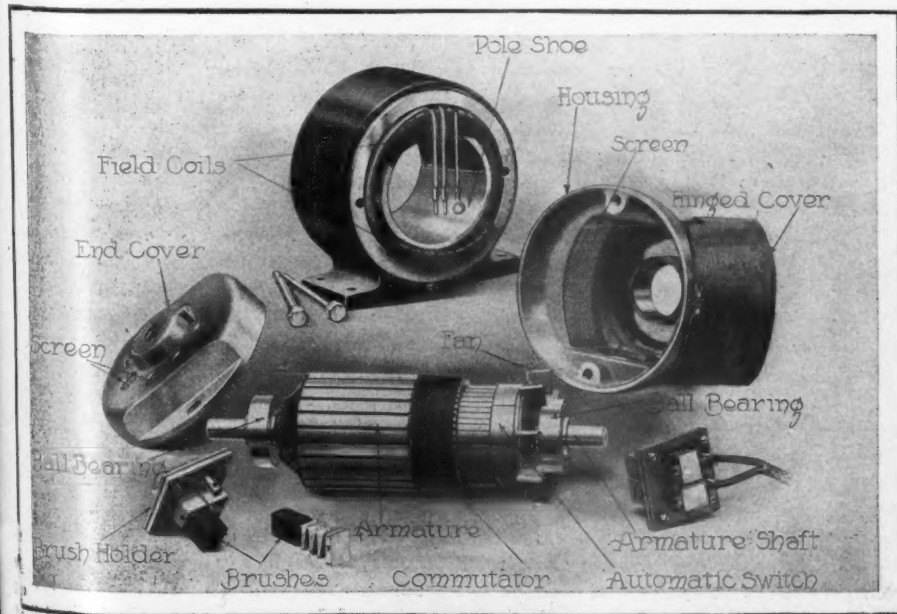


FIG. 4—PARTS OF HOLTZER-CABOT LIGHTING DYNAMO



Brief Business Announcements



ALBANY, N. Y.—William Whipple has opened a garage in the building used formerly as livery by Homer Frink.

Ticonderoga, N. Y.—The Ticonderoga Pulp and Paper Co. is building an immense garage in Main street.

Port Chester, N. Y.—Clifford Flint has purchased interests of John W. Hubbard in the City garage, but Arthur B. Lowden will remain in firm as partner.

Boston, Mass.—Louis Sackett, who recently resigned from the Boston branch of the Oakland, has accepted a position with sales force of the Boston Stutz agency.

Winnipeg, Man.—The local Ford Agency has removed to its new premises, 81-85 Walter street. Its old offices will be occupied in the near future by the Cadillac Motor Sales Co.

Detroit, Mich.—The Federal Motor Truck Co. has added to its staff of executives Garvin Denby. He has been appointed secretary and treasurer with general charge over the sales department.

Phoenix, Ariz.—Arizona has been added to the territory handled from the Los Angeles agency of the Hudson Motor Car Co. A sub-agency has been established in Phoenix. The Hudson formerly was handled locally by W. D. Tremaine.

Kenosha, Wis.—F. D. Oley, chief draftsman for the American Brass Co., of Kenosha, Wis., has resigned to engage in the garage and repair business. Mr. Oley has purchased the business of Thomas B. Whitaker, West Main street, Kenosha.

LaCrosse, Wis.—The Parker-Hirt Co. has been organized to deal in motor cars and accessories. The company has been incorporated with an authorized capital of \$5,000 and E. W. Parker, Joseph F. Hirt and Harriet E. Parker are the incorporators.

New York—William J. Lasher has severed his connection as branch manager of the Carl H. Paige Co., handling the Chalmers, to join forces with the Abbott-Detroit. Mr. Lasher in his new capacity will have charge of the agency business of the Abbott-Detroit Co.

Minneapolis, Minn.—The Bowman & Libby Overland building, one block nearer the center of the city, Twelfth street and Hennepin avenue, has reached the first floor. This is to be 66 by 150 feet, four stories and fireproof. The Goodyear Tire and Rubber Co., will be a tenant. The Colby Motor Co. is erecting a building at Sixteenth street and Hennepin avenue, 50 by 150 feet, to cost \$30,000. H. E. Pence, of the Pence Automobile Co., will erect a large building covering one-quarter of a block, at Tenth street and Henne-

pin avenue, for the Buick and Stearns-Knight cars.

Auburn, N. Y.—Edward A. Ross has opened a thoroughly equipped garage at 20 Water street.

Detroit, Mich.—Harry A. Windsor has been appointed Detroit representative for the Fulton-McCutchan Co., of Chicago, with offices in the Majestic building.

Detroit, Mich.—Guy Vaughan, former engineer for Wyckoff, Church & Partidge, of New York, has joined the engineering staff of the Olds Motor Works, of Lansing.

Antigo, Wis.—G. A. Zwickey and F. J. Zwickey have leased the garage and repair shops at 625 Superior street, recently closed, and have reopened under the style of Service Motor Co.

Albany, N. Y.—Albert Whitney has retired from partnership of the firm of Bishop & Whitney, who conduct a car salesroom here at 224 Baldwin street, but the business will be continued by J. Bruce Bishop.

Detroit, Mich.—Theodore C. Reid of Chicago has joined the sales force of the Grinnell Electric Car Co. and will succeed Homer W. Potter in the local field, Mr. Potter having become traveling representative in the northern territory.

Reedsburg, Wis.—Sorge & Foss have broken ground for a new garage building on Park street. The company is composed of Albert Sorge and Frank Ross, who have secured the agencies for the Rambler and Overland in this territory.

Portland, Me.—George L. Stuart, one of the first motor dealers in Portland, Me., who handled the Cadillac here until recently when he sold out his interest in the agency, has decided to move to Los Angeles, where he will go into business shortly.

Minneapolis, Minn.—The Northwestern Cole Motor Co., 219 Sixth street S., has been formed to handle the northwest distributing business of the Cole Motor Car Co., of Indianapolis. It will occupy the quarters of the Haynes-Knutson company, former distributor. H. P. Wood is president and general manager.

New York—The Stoddard Motor Co., distributor of Stoddard-Dayton cars in the metropolitan territory, has moved from Fifty-seventh street to the building of the United States Motor Co., at Broadway and Sixty-first street. This move is a part of the general plan of concentrating facilities for the sale of products of the United States Motor Co. The show room will be located on the ground floor on the Sixty-first street side of the building, while the entire second floor, running

through to Sixty-second street, will be devoted to service requirements.

Hudson, N. Y.—Hester Brothers have purchased the Malley garage but will continue business under the name of the Warren street garage.

Racine, Wis.—The Mitchell Motor Co., of Seattle, Wash., a Racine corporation subsidiary to the Mitchell-Lewis Motor Co., of Racine, has filed articles of dissolution.

Detroit, Mich.—A. W. Brown, who for many years has been traveling representative of the Herreshoff Motor Car Co., has resigned and will enter the motor truck field.

St. Paul, Minn.—The Cooperative Auto Co. is a new concern headed by S. W. Wicks, formerly sales manager for the White Bear Auto Co. The garage is at 199 West Fifth street.

Boston, Mass.—Edward L. Vail, for several years manager of the Boston branch of the Splittorf Magneto Co., has resigned to accept a position as sales manager and traveling representative for the Hofferker speedometer.

Lyndonville, Vt.—William C. Garry, dealer in motor accessories, has filed a petition in bankruptcy in the United States court giving his liabilities as \$2,585.93 and his assets as \$1,097 of which \$400 is claimed to be exempt.

Rochester, N. Y.—Thomas J. Northway, local Ford distributor, has completed plans for the construction of a three-story, steam-heated salesroom to cost \$12,000. The building will be erected as an addition to the present garage in Exchange street.

Minneapolis, Minn.—George B. Levy and Louis Andersch, as the Andersch Brothers Motor Car Co., who have taken on the Abbott-Detroit line for the northwest, have bought property at Harmon place and spruce place, where they will erect a four-story building for their business.

Phoenix, Ariz.—The Arizona Motor Co., Inc., has been absorbed by the Transcontinental Motor Co. F. A. Carr, manager of the former concern, is now with the Transcontinental. By this deal the Transcontinental company secures the local agency for the Krit car.

Detroit, Mich.—What is claimed to be the largest truck service station in the United States has just been opened in this city by the General Motors Truck Co. The building, which has space to take care of from 150 to 200 trucks, fronts on Fort and Twelfth streets and Lafayette boulevard, and was erected at a cost of about \$150,000. There is a total floor space of 50,000 square feet, which is utilized for garage, repair shops, stock room,

as well as for offices and for a smoking room for the convenience of patrons.

Los Angeles, Cal.—Ralph Hamlin, Franklin dealer here, has just broken ground for a new salesroom and repair shop.

Milwaukee, Wis.—Wagner & Johnson, of Racine, Wis., recently appointed state agents for the Regal, have established their principal headquarters at 370-374 Grove street, Milwaukee.

St. Louis, Mo.—F. S. Cropley, for several years connected with the G & J tire, has taken over the old Federal tire agency in St. Louis and has established a factory branch there. This factory branch

will be the distributing point for the southwestern states.

Baltimore, Md.—The Philadelphia Motor Tire Co. has opened up an agency at 107 West Mt. Royal avenue.

Windsor, Ont.—Frank Miermicke has opened a garage in the Ferris building, and later will secure several agencies for cars and conduct a livery business.

Philadelphia, Pa.—The Lansden-Webb Co. of Philadelphia has been incorporated at Harrisburg with a capital of \$50,000. The local home of the company, which handles the Lansden electric trucks and Webb fire apparatus, is at 616-618 North

Broad street, in charge of Edward R. Griel.

Toronto, Ont.—The Bulldog Tire Co., Ltd., has been incorporated with a capitalization of \$300,000.

St. Louis, Mo.—The Warren Automobile Co., local agent for the Warren line in St. Louis is erecting a new building on Locust street. It will be used as a show and salesroom.

Louisville, Ky.—The McPherson Automobile Co., with an authorized capital stock of \$1,000, has filed articles of incorporation in the county clerk's office. The incorporators are: Franklin McPherson

Recent Agencies Appointed by Car and Truck Manufacturers

PLEASURE CARS

Town	Agent	Car
Armington, Ill.	R. L. Kampf	Cole
Aurora, Ill.	C. C. Hinckley	Cole
Bath, Me.	Jerry Washburn	R. C. H.
Birmingham, Mich.	George C. Hupp	R. C. H.
Binghamton, N. Y.	J. V. Ashley	Palmer-Singer
Bloomington, Ill.	J. W. Walters	Cole
Bloomington, Pa.	C. W. McKelvey	Palmer-Singer
Boston, Mass.	F. E. Proctor	Krit
Brockton, Mass.	Loring Motor Car Co.	Palmer-Singer
Bryan, Tex.	Dr. P. M. Raysor	R. C. H.
Buffalo, N. Y.	R. H. Pattison	Overland
Center, Tex.	Howard C. Parker	R. C. H.
Champaign, Ill.	J. L. Wiese & Son	Cole
Chicago	John Hemwall Auto Co.	Cole
Chillicothe, Mo.	Ch. L. Gilbert	R. C. H.
Columbus, O.	Columbus Auto Inn	Reo
Crescent City, Ill.	Crescent Garage & Supply Co.	R. C. H.
Columbus, O.	D. W. Short	Metz
Columbus, O.	Edward Miller	Premier
Columbus, O.	F. E. Avery	Packard
Columbus, O.	G. E. Thomas Co.	Studebaker
Columbus, O.	High-Seventh Garage	Michigan
Columbus, O.	Sitgreaves & Boyd	R. C. H.
Columbus, O.	Snyder Automobile Co.	Abbott-Detroit
Dallas, Tex.	Life & Miller	Regal
Decatur, Ill.	Frank L. Winters	Cole
DeKalb, Ill.	G. H. Dean & Co.	Cole
Denver, Colo.	W. W. Barnett	Palmer-Singer
Danville, Ill.	I. B. Chambers & Son	Cole
Richmond, Va.	Charles W. Shields & Co.	Palmer-Singer
Frankfort, Ind.	Model Machine Works	Cole
Fall River, Mass.	F. W. Davis & Sons	Cole
Flora, Ind.	Greider & Hawkins	R. C. H.
Ft. Wayne, Ind.	Ft. Wayne Iron Store Co.	Cole
Gadsden, Ala.	K-E Auto & Electric Co.	Oakland
Gladstone, Mich.	Charles Silning	Palmer-Singer
Hartford City, Ind.	Kathryn P. Carroll	R. C. H.
Holyoke, Colo.	George W. Garland	R. C. H.
Houston, Tex.	Peters Brothers	Palmer-Singer
Iowa City, Ia.	H. A. Knease & Sons	Cole
Jennings, La.	J. E. Parsons	Buick
Kankakee, Ill.	Fleming & Brown	Cole
Kewanee, Ill.	Kewanee Garage	Cole
Kossuth, Pa.	G. E. Kelly	R. C. H.
Lancaster, O.	Mattox Motor Car Co.	Empire
Lancaster, O.	Mattox Motor Car Co.	Mitchell
La Crosse, Wis.	Elsen & Phillips	Cole
Lockport, N. Y.	Niagara Garage	Ford
London Mills, Ill.	Zenette Groom	Palmer-Singer
Marion, Ia.	J. L. Ingram	Franklin

TRUCKS

Adrian, Mich.	J. Beckenbaugh	Modern
Albany, Ore.	Barrett Brothers	Federal
Anaheim, Cal.	J. J. Weisel & Co.	Federal
Austin, Tex.	Ben M. Barker	Federal
Bakersfield, Cal.	Ben L. Brundage	Federal
Columbus, O.	Avery Truck Co.	Avery
Connellsville, Pa.	Connellsville Garage	Federal
Dallas, Tex.	W. T. Fulton Co.	Wichita
Dallas, Tex.	Alamo Automobile Co.	Federal
Eugene, Ore.	J. S. Airheart	Federal
Fresno, Cal.	C. W. Hobson Co.	Federal
Ft. Wayne, Ind.	Drage-Harris Motor Truck Sales Co.	Modern
Fitchburg, Pa.	Fitchburg Hardware Co.	Federal
Fall River, Mass.	Robert W. Powers	Federal
Hollywood, Cal.	J. E. Carroll	Federal
Hamburg, N. Y.	D. W. Brodbeck	Federal
Houston, Tex.	Alamo Automobile Co.	Federal
Imperial, Cal.	Edgar Brothers	Federal
Long Beach, Cal.	McKenzie & Bellows	Federal
Los Banos, Cal.	W. M. Roberts	Federal
Lawrence, Mass.	Smith Brothers	Federal
Missoula, Mont.	J. J. Deakin	Modern
Marion, O.	C. R. Merchant	Modern
Nashville, Tenn.	Charles W. Callicouette	Modern
New Orleans, La.	Joseph Schwartz Co., Ltd.	Adams
Pomona, Cal.	Whip & Zander	Federal
Pendleton, Ore.	M. K. Long	Federal

Town	Agent	Make
Meadville, Pa.	Thomas & Kiebert	Palmer-Singer
Middletown, N. Y.	Hotel Brown Garage Co.	Cole
Minneapolis, Minn.	John P. Snyder Automobile Co.	Stevens-Duryea
Momence, Ill.	W. J. Riley	Cole
Montgomery, Ala.	Cole-Montgomery Motor Co.	Cole
Montreal, Can.	E. Major	Palmer-Singer
Montreal, Que.	Royal Automobile Co.	Cole
Mt. Carmel, Ill.	Baumgart & Co.	Palmer-Singer
Mt. Bullion, Cal.	J. J. Youd	R. C. H.
Mulberry, Ind.	Burkhalter Brothers	R. C. H.
Muncie, Ind.	Muncie Garage	R. C. H.
Nedham, Ind.	L. M. Megee	Cole
Newark, N. J.	Henry Heinsheimer	Palmer-Singer
New Haven, Conn.	Ray L. Bishop Motors Co.	Marion
New Orleans, La.	Myatt-Dicks Motor Car Co.	Franklin
Olney, Ill.	B. E. Brading & J. M. Swick	Cole
Peoria, Ill.	C. W. Robison & Co.	Cole
Peshigo, Wis.	Eugene St. Peter	Buick
Philadelphia, Pa.	Liberty Motor Co.	Palmer-Singer
Portage, Wis.	A. R. Slinger	Cole
Portland, Ore.	Becker Automobile Co.	R. C. H.
Providence, R. I.	Pugh Brothers	Palmer-Singer
Pueblo, Colo.	Ideal Motor Car Co.	Palmer-Singer
Ravenna, O.	Dale Dietrich	Cole
Reedsburg, Wis.	Sorge & Foss	Overland
Reedsburg, Wis.	Sorge & Foss	Rambler
San Antonio, Tex.	C. H. Dean	Hupp-Yeats
Sandusky, O.	Welby C. Waterfield	Cole
San Francisco, Cal.	A. D. Perkins	Perfex
Santa Rosa, Cal.	E. M. Dates	R. C. H.
Schenectady, N. Y.	V. E. Berning	Palmer-Singer
Sioux City, Ia.	Cole Motor Co.	Cole
Spokane, Wash.	L. W. Gilmore	R. C. H.
Spokane, Wash.	Spokane Taxicab Co.	Detroit
Springfield, Ill.	Van Duyn & Mathias	Cole
Springfield, Mass.	Blue Ribbon Garage	Palmer-Singer
St. Louis, Mo.	Lindsay Motor Car Co.	Flat
St. Louis, Mo.	Meyer-Busch Automobile Co.	Speedwell
St. Louis, Mo.	N. W. Bond Automobile Co.	Glide
St. Paul, Minn.	Smith & Heberle	Little
Syracuse, N. Y.	J. T. Mollard	Palmer-Singer
Toronto, Can.	C. A. Finzel	Rambler
Trenton, N. J.	H. E. Stout & Son	Palmer-Singer
Wabash, Ind.	C. M. Story	R. C. H.
Walla Walla, Wash.	J. M. Moor	Overland
Washington, D. C.	Warrington Motor Co.	Palmer-Singer
Wilmington, Del.	Wilmington Michigan Motor Car Co.	Michigan
Wilmington, N. C.	Queen City Cycle Co.	Palmer-Singer
Winnipeg, Can.	Lion's Auto Garage	Marmon
Worcester, Mass.	Harvey Parker	Palmer-Singer

Pasadena, Cal.	Munroe Motor Co.	Federal
Reno, Nev.	J. R. Wainwright	Federal
Santa Anna, Cal.	T. W. Neely	Federal
Salem, Ore.	W. J. Pruitt	Federal
Sydney, Australia	H. Halburn Potts	Modern
St. Louis, Mo.	Standard Automobile Co.	Commerce
Stockton, Cal.	Sampson Iron Works	Federal
Salt Lake City, Utah	Cheeseman Auto Co.	Federal
San Diego, Cal.	Hunt Auto Co.	Federal
Springfield, Mass.	W. H. Baxter	Federal
St. Paul, Minn.	Pence Automobile Co.	Federal
Tillamook, Ore.	A. H. Harris	Federal
Taunton, Mass.	Brownell & Burt	Federal
Tacoma, Wash.	Pacific Car Co.	Federal
Toronto, Can.	Canadian General Electric Co.	Knox
Toronto, Can.	Central Garage Co.	Abbott-Detroit
Ventura, Cal.	R. O. Dennison	Federal
Victoria, Tex.	Texas Motor Car & Supply Co.	Federal
Whittier, Cal.	Saunders Brothers	Federal
Washington, D. C.	Peerless Motor Transfer Co.	Modern
Winston-Salem, N. C.	Motor Co.	Modern
Worcester, Mass.	Power Truck Sales Co.	Adams
Watsonville, Cal.	H. G. Brewington Co.	Federal
Waco, Tex.	Percy Willis	Federal

son, Catherine McPherson and Olive McPherson. The new concern will engage in the repair business.

Guelph, Ont.—With a capital of \$40,000, the Sterling Rubber Co., Ltd., has commenced business here.

Sherbrooke, Que.—The Canada Tire Filler Co., Ltd., with a capital stock of \$150,000, has been incorporated with headquarters here.

Binghamton, N. Y.—William G. Faatz has purchased the interests in Brown's garage of Howard Brown. He will continue to conduct a general sales business.

Philadelphia, Pa.—A direct factory branch of the Federal Rubber Mfg. Co., of Milwaukee, has been established at 707 North Broad street, in charge of Harry D. Benner.

Buffalo, N. Y.—The Willys-Overland Motor Co., Toledo, O., is planning to construct a three-story salesroom and garage at 1075 Main street, land having been purchased for \$39,000.

Atlanta, Ga.—The Atlanta Taxicab Co. has surrendered its charter. It has been in the hands of a receiver, Elliott E. Cheatham, for some time. Judge George Bell has just named Mr. Cheatham permanent receiver.

Racine, Wis.—The Wallis Tractor Co. has been organized by H. M. Wallis to engage in the manufacture of a line of farm tractors. The company is incorporated with a capital stock of \$300,000 and in addition to Mr. Wallis, W. C. Quarles, of Milwaukee, and Markley Wells, of Racine, are associated in the company.

Indianapolis, Ind.—A number of changes are reported in the trade in Indianapolis and vicinity. Joe Kelly, formerly sporting editor of the Indianapolis Sun, has become advertising manager for the Cadillac Automobile Co. of Indiana. F. O. Lane has become factory manager of the Gates Mfg. Co. of Indianapolis. H. M. Freeman, treasurer and manager of the Finch & Freeman Auto Co., has become general sales manager of the Clark Motor Car Co., Shelbyville. H. W.

Martz has been appointed a salesman for the A and M Sales and Service Co. of Indianapolis.

Cohoes, N. Y.—William D. Bowles has been appointed manager of a new garage of the Congress Garage Co., on Lancaster street.

Brooklyn, N. Y.—Isaac Kirkman has purchased a three-story brick building at 33 Grant avenue and will remodel it into a garage and salesroom.

Lexington Co.—The Kentucky Automobile Co. of Louisville will establish a branch at Lexington. Work on the new structure in that city has already been started.

New Orleans, La.—A factory branch of the Oakland Motor Co. has been opened here. W. C. Cray is in charge of the new place, which has secured quarters at 745 Baronne street.

Baltimore, Md.—The Ford Auto Co., of Baltimore, is looking around for about 3,000 feet of additional floor space. The firm finds the present plant at 122 West North avenue inadequate.

Detroit, Mich.—The Century Electric Motor Car Co. has removed its factory to the new building erected by the company at Woodward and Lathrop avenues and has started work with two shifts, night and day.

Menominee, Mich.—The D. F. Peyer Co., manufacturing the Menominee truck, Menominee, Wis., has been organized with \$75,000 capital. The new company takes over the interests of W. S. Carpenter. The officers are: President, D. F. Peyer; vice-president, F. J. Trudell; secretary-treasurer, Harry S. Emerson.

New Orleans, La.—Enlarging business has made it necessary for the Hudson agency to occupy more spacious quarters. A completely equipped repair shop has been installed in connection with the new sales rooms at Baronne and Perdido streets. C. M. Hanson, agent for the Cleveland car, has opened improved sales rooms at St. Charles and Julia streets. The Day Automobile Co., handling the

local agency for the Paige-Detroit and the Alco companies has moved into new quarters on Rampart street.

Poughkeepsie, N. Y.—William Bonner has completed plans for the construction of a fireproof garage on the site of the Dusenbury garage.

Andover, Mass.—The Tyer Rubber Co. has its new addition nearly completed and in a couple of weeks the company will be manufacturing tires of all kinds for motor vehicles.

St. Louis, Mo.—The St. Louis Lozier Co., organized to take the agency for the Lozier line in that territory, has opened salesrooms in St. Louis. Nelson S. Gottshall will be in charge.

Boston, Mass.—The Boston agency of the Havers six has moved into new quarters at 121 Massachusetts avenue, recently vacated by the Roberts & Sherburne Co., agent for the American.

San Francisco, Cal.—The Frank O. Renstrom Co. has completed a deal with the Regal Motor Car Co. of Detroit, whereby it hereafter will handle the distribution of the entire Regal line of cars in northern California and Nevada.

Chicago—The Buick Motor Co. has moved its retail salesroom from 1452 Michigan avenue to its main building at Twenty-first and Calumet avenue. The move was made for the purpose of concentrating all of the business at the one point.

Philadelphia, Pa.—A direct factory branch of the Republic Rubber Co., of Youngstown, O., has been opened at 328 North Broad street. The territory of the new branch, which is in charge of J. W. Lyman, comprises eastern Pennsylvania, southern New Jersey, District of Columbia, Maryland and Virginia.

Rochester, N. Y.—G. F. Cox has been appointed local manager of the Fordham company, recently organized with capital of \$3,000, for the purpose of manufacturing motor vehicles. The new company has secured for its supply and repair establishment the Hollis-Rand garage on Fordham near Berkeley street. Robert

Atlantic City, N. J.—Holland, Donnelly Co., capital stock, \$100,000; general motor car business; incorporators, E. J. Holland, E. R. Donnelly, H. L. Giberson.

Benton, Ill.—Benton Motor Car Co., capital stock, \$65,000; to manufacture motor cars and accessories; incorporators, H. Stotlar, W. S. Cantrell, A. H. Fraunfelder.

Buffalo, N. Y.—Corporate Sales Co., capital stock, \$5,000; to deal in motor cars and accessories; incorporators, C. J. Wolfe, E. H. Blandy, W. Kobe.

Chicago—Guaranty Auto Co., capital stock, \$50,000; incorporators, J. T. Shea, E. Cripsl, C. D. Rattenhoefen.

Chicago—National Radiator Co., capital stock, \$30,000; motor car supplies; incorporators, G. W. Platt, E. C. Schwitt, R. L. Dollings, A. M. Draddy, M. F. Platt.

Cleveland, O.—Service Garage Co., capital stock, \$10,000; to deal in motor cars and accessories; incorporators, Roy J. Ramson, K. W. Volk, F. Desberg, W. McMahon, J. W. Whildis.

Columbus, O.—J. C. Sherwood Rubber Co., capital stock, \$20,000; to deal in tires; incorporators, J. C. Sherwood, W. S. Sherwood, R. C. Creppen, P. J. Cull, C. L. Creppen.

Recent Incorporations

Daytona, Fla.—Daytona Auto Supply Co., capital stock, \$1,000,000; president, A. G. Hunt; secretary, H. C. Thompson.

Detroit, Mich.—Traveler Motor Car Co.; motor cars and accessories; incorporators, J. P. McIntyre, J. P. Lavigne and others.

Elizabeth, N. Y.—Excelsior Automobile Co., capital stock, \$50,000; general motor car business; incorporators, P. H. McGann, C. Ralms, P. Kern.

Johnson, Pa.—United States Motor Sales Co., capital stock, \$50,000; incorporators, A. C. Smiler, J. L. Smiler, C. H. Raymond.

Newark, N. J.—McDonough Cogan Motor Car Co., capital stock, \$25,000; general motor car business; incorporators, E. Donough, F. T. Cogan, G. T. McDonough.

Newark, N. J.—Ka Dix Newark Motor Truck Co., capital stock, \$100,000; commercial and fire fighting trucks; incorporator, G. F. Kalberg.

Newark, N. J.—American Piston Ring Co., capital stock, \$25,000; incorporators, A. Wenzel, W. S. Schmidt, B. Wenzel.

New York—T. F. Hahn Co., capital stock, \$10,000; incorporator, E. Hahn.

New York—Used Car Co., capital stock, \$5,000; deal in motor cars; incorporators, A. F. McNamara, G. Galliani, J. J. Kramer.

Nyack, N. Y.—Nyack Garage, capital stock, \$15,000; incorporators, A. Leggett, J. J. Laine, P. J. Duboise.

Phoenix, Ariz.—D. & G. Tire Filler Co., capital stock, \$100,000; director, J. U. Garver.

Rochester, N. Y.—Electric Car Sales and Service Co., capital stock, \$10,000; to deal in electric motor vehicles; incorporators, M. Bernstein, M. L. Bohrer, G. H. Leaty.

St. Louis, Mo.—Heinrich Automobile Co., capital stock, \$2,500; to deal in motor cars; incorporators, V. Heinrich, H. Heinrich, C. Leykam.

White Plains, N. Y.—General Rim Co., capital stock, \$150,000; to supply motor vehicles and accessories; incorporators, W. Kaul, R. W. Ashley, F. Oberkirsch.

Rand will continue as local agent for the Jackson in the Hollis-Rand garage.

Louisville, Ky.—The Clark Motor Car Co., local agent of the Maxwell and Reo, is erecting a new garage on the south side of Broadway, between Brook and Floyd streets.

Detroit, Mich.—The Lewis Spring and Axle Co., of Jackson, has moved its control department to this city with headquarters in the Boydell building. Fifty men will be employed.

Detroit, Mich.—W. E. Kenyon, who recently resigned from the sales force of the Poss Motor Truck Co., has accepted a position as sales representative with the Commerce Motor Truck Co.

Minneapolis, Minn.—The Ford Motor Co. opened its Minneapolis branch and its St. Paul sub-branch October 1. W. C. Anderson, formerly St. Louis Ford branch manager, is in charge. Temporary quarters are in the Great Northern Implement building. Construction of the Minneapolis branch building will begin at once.

Pittsburgh, Pa.—Augustus Hartje, the Pittsburgh paper manufacturer, is having plans prepared for a large motor car storage building to be erected at South Twelfth and Sarah streets. The enterprise will be managed by a company which Mr. Hartje has organized. The building will be constructed of concrete and steel,

measuring 275 by 275 feet. It will cost \$100,000.

Detroit, Mich.—The National Top and Curtain Co., organized to handle Jiffy curtains, has just announced the opening of a store on upper Woodward avenue near Willis.

Columbus, O.—Papers have been filed with the secretary of state increasing the authorized capital stock of the Buckeye Motor and Cycle Co., of Akron, from \$5,000 to \$15,000.

Philadelphia, Pa.—The Firestone Tire and Rubber Co., now located at 256 North Broad street, will, upon completion of its new quarters some time during October, remove to 304 North Broad street.

Phoenix, Ariz.—John A. McCondra has disposed of his interest in the Transcontinental Motor Co. to F. A. Carr, and that concern will hereafter be known as the Carr Motor Co. It will handle Reo, Krit and Abbott-Detroit. McCondra has formed a partnership with L. E. Hoeye and they have opened a salesroom at First and Monroe streets. They will sell Hupmobiles and Hudsons.

Mishawaka, Ind.—The Star garage has been sold to Robert Harvey, owner of the Harvey Auto Livery, operating in Mishawaka and South Bend. Guy Stutzman, former manager of the garage, has severed his connection with it and will devote his time to the sale of the Oakland,

for which he is agent in St. Joseph, Elkhart and Marshall counties.

Springville, N. Y.—The Auto Pump Co. is moving its plant to Buffalo, N. Y. Most of the employes will move to Buffalo and continue in the pump company's employ.

Ottawa, Ont.—Stanley & Morris have been appointed local agents for the Mitchell Motor Sales Co. of Canada, London, Ont., Canadian distributor for Mitchell cars.

Boston, Mass.—M. E. Gamble has been appointed manager of the Boston branch of the Universal Motor Truck Co., succeeding to the position left vacant by the resignation of Charles Addison Malley.

Pulaski, N. Y.—The Pulaski Auto Supply and Garage Co. has leased the Selkirk building for purpose of conducting a general motor car business, of which G. C. Edick, Anselm W. Brown and George H. White are in partnership.

Syracuse, N. Y.—The capital stock of C. Arthur Benjamin, Inc., has been increased from \$5,000 to \$100,000. The present stockholders are C. A. Benjamin, Ernest F. Fuller and Harold L. Dyer. The object of increasing capitalization is to extend the business and provide for a new building. The company's garage is now at 410 West Onondaga street. A large structure is to be built but the site is not yet selected.

SPEED OF THE STUDEBAKERS

DETROIT, Mich.—Editor Motor Age—The writer has been much interested in several letters, which have appeared in Motor Age from time to time, relative to the remarkable speed of the Studebaker—Flanders—20 motor cars. It may be of interest to those who have been discussing the question, as well as thousands of other owners of these cars, to know some of the very definite results achieved by the Studebaker Corporation in its experimental work with this car.

Laboratory tests had shown, early in the history of the car, that it possessed motor speed which, if not unique, was at any rate remarkable. To secure official data on this quality, it was decided to make a public demonstration. An official American Automobile Association sanction was accordingly secured, for a record trial at the Indianapolis speedway. Both before and after the trial, the cars were rigidly examined by F. E. Edwards, chairman of the A. A. A. technical committee, and pronounced strictly in accord with stock car rules.

The trial took place November 13, in rather unfavorable conditions. A freezing temperature prevailed and a wind varying from 20 to 30 miles in velocity faced the cars as they came down the stretch. Despite this, records for the class were established, from one to twenty miles. The trials were, of course, electrically timed.

Manufacturers' Communications

The records still stand in the American Automobile Association's table.

The 5-mile stock car record established by the Studebaker 20 was 4:22.98, an average of 52.6 seconds to the mile, or, 68.44 miles per hour. With a 3-4-7 to 1 gear and 30-inch wheels this required an actual motor speed of 2,700 revolutions per minute, which, however, was greatly exceeded on some parts of the 2½-mile circuit. In the mile where the car faced the wind its speed was greatly retarded. The fastest recorded by the timing apparatus was, in fact, 56.80—63.38 miles per hour—over this stretch. To accumulate a grand average of 68.44 miles per hour it is obvious that the car must have traveled the 1½ miles where the wind was either neutral or favorable, at a rate of about 48 seconds to the mile, or over 74 miles per hour. This clearly implies a motor speed of 3,000 revolutions or over, under load. This fact is particularly interesting in view of the opinion of the California correspondent of Motor Age who insists that no manufacturer ever has dared to claim such a motor speed for his product.

As to gear ratios and their relation to speed, it has been the experience of our

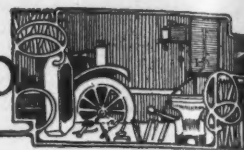
experimental department that, on small tracks and average courses, best results can be obtained with the stock ratio of 4 to 1. This is, of course, true on account of the very high motor speeds which the car develops. A very large share of the track successes which these cars have won in contests all over the country, is undoubtedly due to the great motor speed which enables a driver to resume maximum speed quickly, after shutting off for a turn. The Indianapolis cars were, as I have stated, geared 3-4-7 to 1, but there are few Studebaker owners who can command a course like Indianapolis on which to extend their cars.—Studebaker Corporation, Paul Hale Bruske, contest manager.

EXPLAINS RACE MAGNETO TROUBLE

Milwaukee, Wis.—Editor Motor Age—Regarding the necessary withdrawal of Mulford's and Tetzlaff's cars during the Vanderbilt race at Milwaukee, I take this opportunity to advise that Mulford's magneto was taken down and reassembled by himself; in doing so he evidently did not assemble the ball race properly, which must have broken and caused the magneto to seize. Our mechanics were not permitted to overhaul this magneto previous to the contest. The driving shaft which operates the magneto on Tetzlaff's car broke, evidently due to his tremendous speed.—Bosch Magneto Co., A. H. Bartsch, advertising manager.



The Motor Car Repair Shop



Splicing Inner Tubes

WHEN the tube has been badly pinched in assembling or blown out from other causes and is in such condition that patching is impossible, it then becomes necessary to put in a new sleeve by means of splicing. To make this splice cut out the ruptured portion of the tube with the scissors. Then use the splicer, an instrument consisting of two tubes, one of which fits inside of the other at one end and through which the ends of the tire tubes are passed and turned over like a cuff. Put one end of the tube through the splicer and turn it back over the end of the splicer about 2½ inches and put the other end of the tube through the center of the other splicer and turn it back about 5 inches. Then turn again toward the same end of the splicer, which will give a double lap, as shown at A, Fig. 1. Taper the edges of the tube with a sharp thin knife, so that the splice will not be rough. The surface to be joined should be roughed with a wire buffer or brush in the same manner as preparing for a patch.

These surfaces are then cemented and allowed to dry from 15 to 20 minutes. The splicer is then adjusted in position to unite, as shown at B. An air tube is then connected on the larger splicer and the curing solution applied on both ends of the tube. The tube from the larger splicer is then blown onto the other end of the tube on the smaller splicer, as indicated at C. To obtain good results the ends of the tube should be spliced immediately after the curing solution has been applied. It is then wrapped tightly with a rubber band or an old bicycle tube and kept un-

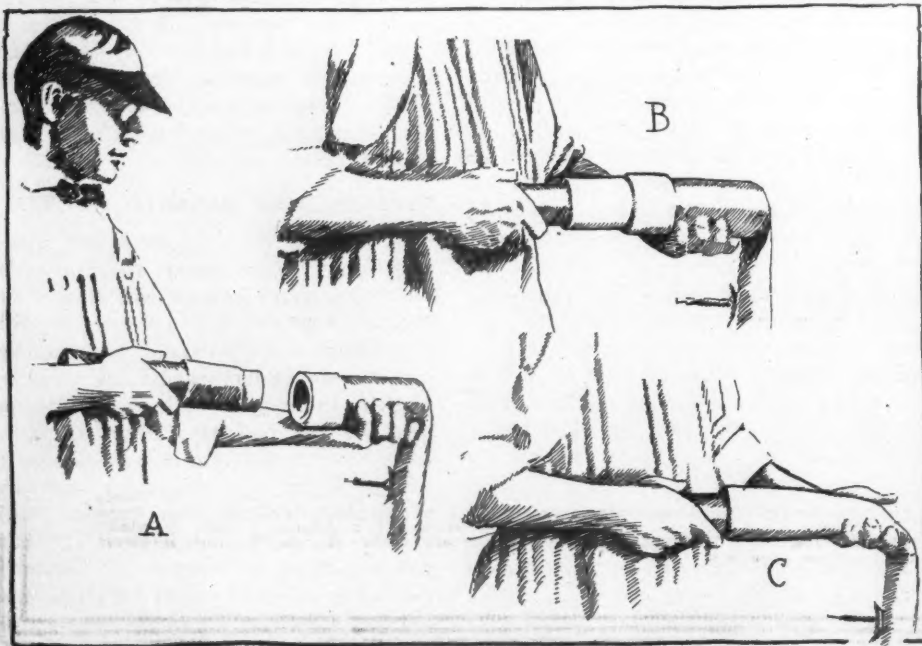


FIG. 1—THREE STEPS IN SPLICE OF INNER TUBE

Repairing Motor Tires Part III

NOTE—The first article of this page is the third of a series of tire repair hints from a manual of the Goodrich company.

der this pressure for 15 minutes. After removing the rubber bands and splicers the tube is ready for service.

Use of Air Bags

Insert the deflated bag into the case, using enough padding in the bottom of the case to fill out snugly. Several plies of fabric or a pad made from the carcass of an old case will answer the purpose. Screw the bead molds down snugly, then apply about 50 pounds air pressure, never more than 60 pounds. When the bag is not in use keep it inflated enough to be well rounded. Any air bag used in a size larger case than intended for it must be properly padded, otherwise it will soon be ruined. It should never be removed from a case by grabbing hold of the tube, as the latter will be torn sooner or later. Take the air bag by its lower end and force it out by putting the hand underneath it.

Marking Piston Rings

The amateur or junior repairman who removes the piston rings from a piston for the first time; either for the purpose of examining the piston-ring slots for sand-holes, or wear, or for cleaning the rings and slots, generally neglects to see that the rings are marked so that they may be replaced in their proper grooves. The result is, that considerable difficulty often is experienced in getting the rings back onto the piston in good order. To avoid this,

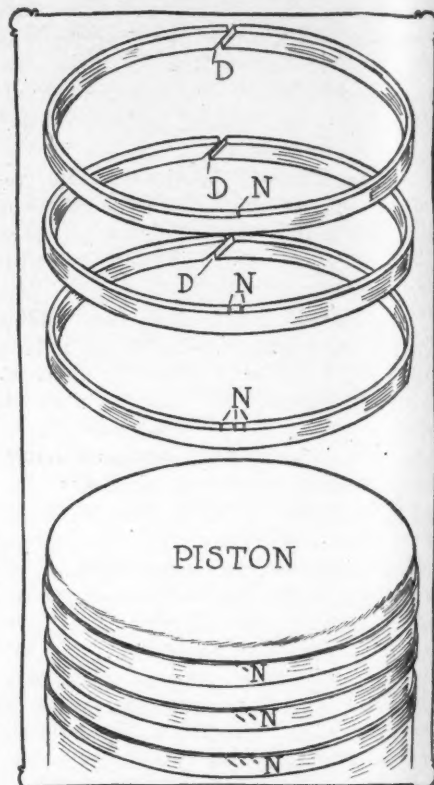


FIG. 2—METHOD OF MARKING PISTON RINGS

one foreign manufacturer of motor cars marks the piston rings as indicated in Fig. 2.

The rings in the top groove of a piston has one notch N in the upper, inner edge, opposite the diagonal D, where the ring is thickest. This notch is made with a file and is very small, so as to be visible, but at the same time not deep enough to weaken the ring. In a similar manner, the next ring below the one nearest the piston head is marked with two notches; the third ring from the piston head, with three notches; and if more rings are used a corresponding number of notches is employed to mark them. With rings thus marked there should be no difficulty in getting rings replaced in their proper grooves. Care should be taken, however, when the rings from more than one piston be removed at the same time. In fact, it is advisable to remove, clean and replace the rings of one piston, before removing the rings of another piston.

Water in the Garage

Water is one of the cheapest of garage supplies, and in the washing of motor cars it is the most valuable; yet it is surprising how few maintenance garages have adequate washrack facilities. A mild stream of running water through a hose is the safest cleanser for fine coach work.